

American

FORESTS

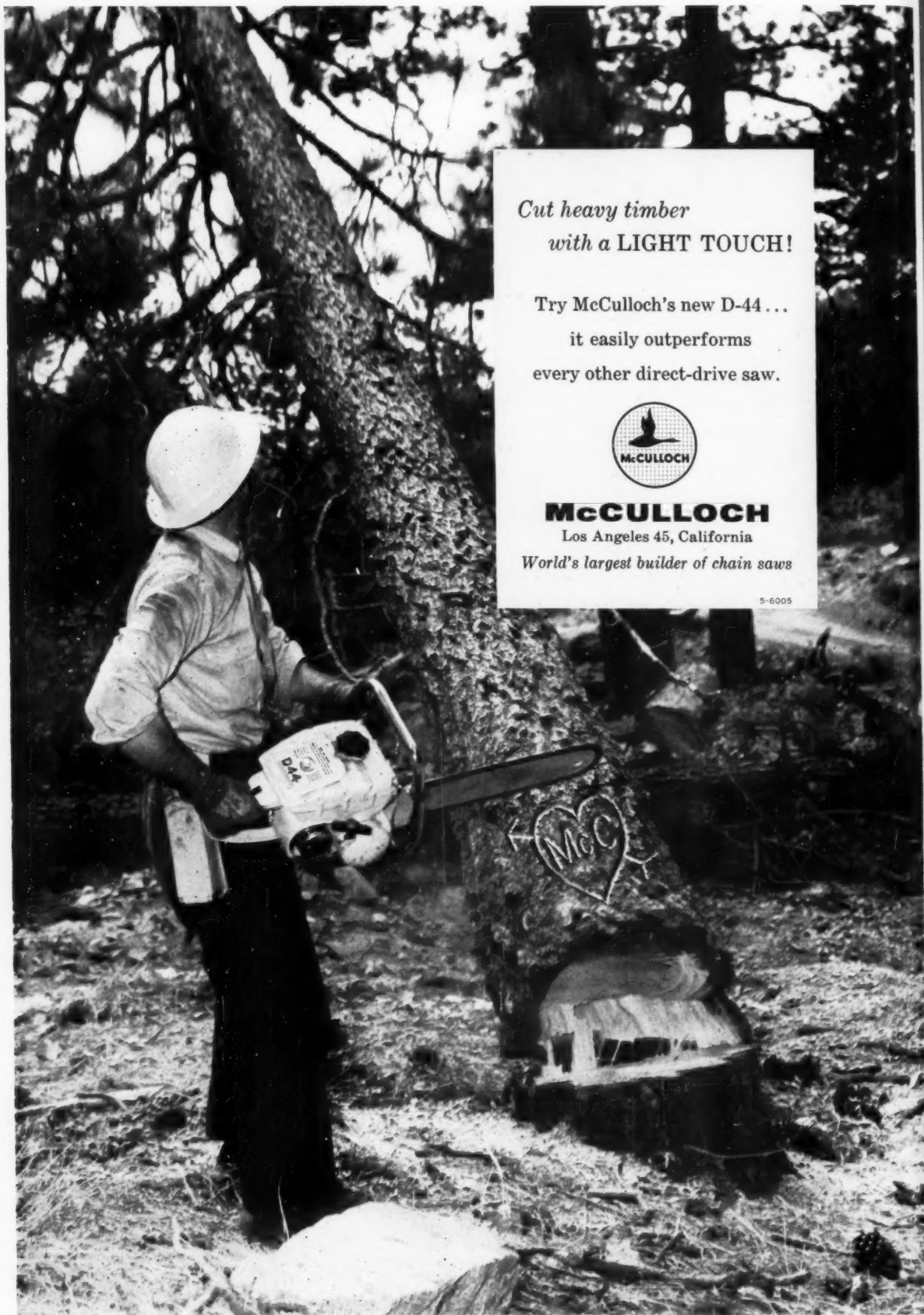
FEBRUARY, 1957

50 CENTS



A WOODLOT OWNER • by Richard M. Bissell

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Dr. Stanley Gessel, Associate Professor in forest soils, University of Washington College of Forestry and Dr. Eugene Steinbrenner, (right), forest soil research specialist, Weyerhaeuser Timber Company. Above, they examine compacted soil to establish its ability to grow new tree crops. Both are engaged in soils research programs intended to improve timberland productivity.

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American FORESTS

PUBLISHED BY THE AMERICAN FORESTRY ASSOCIATION

James B. Craig
Editor

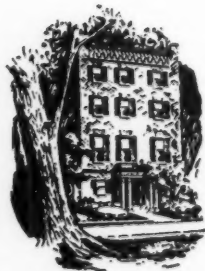
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The AFA

The American Forestry Association, publishers of *American Forests*, is a national organization—independent and non-political in character—for the advancement of intelligent management and use of forests and related resources of soil, water, wildlife and outdoor recreation. Its purpose is to create an enlightened public appreciation of these resources and the part they play in the social and economic life of the nation. Created in 1875, it is the oldest national forest conservation organization in America.

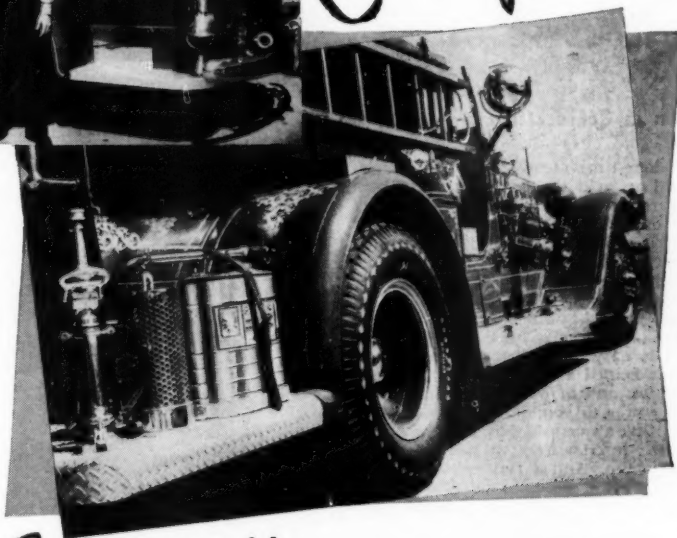
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NEWSBRIEFS

B. Frank Heintzleman, Governor of Alaska, and former Regional Forester of the Territory, resigned last month after 46 years of public service. He was lauded by President Eisenhower for a job "well done" in developing Alaska's natural resources and establishing a pulp industry in the area. . . . The Diamond Match Company announced that Leo V. Bodine, executive vice president, National Lumber Manufacturers Association, has been appointed its vice president in charge of timber and lumber operations with headquarters at Spokane. Mr. Bodine's initial responsibilities will include supervision of Diamond's Northwest Lumber Division which operates properties in Idaho, Montana and Washington. . . . Another announcement of last month was that Robert E. Dougherty, Mr. Bodine's administrative assistant at NLMA, has joined the Washington, D. C. law firm of Hawes, Gosnell and Dougherty. . . . Edward N. Munns, of 1639 Garnet Lane, Concord, California, chairman of the Committee on Forestry History, Society of American Foresters, reports that his group is assembling material on Raphael Zon, pioneer American forester, who died last month, with the view of preparing a biography of the research specialist's life and work. The committee would like to have or locate any and all correspondence, copies of speeches, lectures and notes written by Mr. Zon and pictures and snapshots in which Mr. Zon appears. All material to be dated as closely as possible. . . . Wanted, foresters and other men with horticultural and arboricultural experience by *Heath Survey Consultants*, Wellesley, Mass. An expanded program in 45 of the 48 states provides "extremely interesting employment" opportunities by this firm that specializes in leakage control surveys. . . . Special Awards: *Progressive Farmer* magazine "Man of the Year"—George W. Dean, state forester of Virginia; Pennsylvania Forestry Association's Conservation Award to Maurice K. Goddard, Secretary, Department of Forests and Waters, Pennsylvania; The Society of Finnish Foresters Distinguished Service Awards to Dr. Hardy L. Shirley, Dean, Syracuse School of Forestry, and Dr. Edwin C. John, Syracuse, for outstanding activities in behalf of international forestry; New England Forestry Council Award of Year to Prof. Kenneth E. Barraclough, Univ. of N. H.



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Forest Forum

Women in Conservation

EDITOR:

As a long-time member of your association and an avid reader of *AMERICAN FORESTS*, I rejoiced to read Henry Clepper's article on "Women in Conservation." I agree that women's contribution to the development of forestry in this country never has been adequately recognized, and for that reason this article as a starter is fine. Your magazine has stressed the individual contributions of men to the saturation point, but nary a word about the women who have helped along the growth of your organization and of our forests until now.

More power to you; it is a good sign of growth. Give us occasionally a bit of distaff news along forestry lines; it will help your circulation too. And a Happy 1957 to you all.

Mildred Roberts
5200 Oakland St.
Los Angeles 32, Calif.

EDITOR:

Your magazine's article on "Women in Conservation" in the December issue was noted with interest.

Each year the Kentucky-Tennessee Section of the Society of American Foresters recognizes a layman in each state who has made the greatest contribution to forestry. The 1956 Forestry Recognition Award winner for Kentucky was Mrs. J. Kidwell Grannis, who was mentioned in the above named article. Mrs. Grannis was presented an engraved plaque at the winter meeting of the Section in early December.

James A. Newman
Society of American Foresters
Kentucky-Tennessee Section

"Not Really Necessary . . ."

EDITOR:

In the last paragraph of his letter to *American Forests*, November, 1956, Senator Humphrey states, "... In the present dearth of Administration leadership, the responsibility clearly falls upon the Congress to set the guidelines through hearings, debates and legislation."

As I interpret it, this statement seems to imply that because of lack of leadership on the President's part (a purely partisan political assumption), professional foresters and other career men in departmental agencies are therefore not qualified to do their job in preserving the wilderness areas under their jurisdiction. This kind of reasoning, together with his support, a few years ago, of ninety percent parity payments to farmers leads me to look darkly upon his kind of leadership on matters of land management policy.

Though I was originally in favor of S. 4013, I am coming to agree with the AFA

that the legislation is not really necessary, and that it could conceivably interfere with management of government lands in many individual cases.

I think more could be done for wilderness by providing more protection and less concessionairism in the national park system. Far more damage has been and is being done by vandalism and its confusingly similar sister, "improvements" within our parks than any administrative policy on our forests.

Robert A. Hellmann
Dept. of Public Instruction
The American Museum
of Natural History
New York 24, N. Y.

The Big Debate

EDITOR:

I have followed with interest the editorials and correspondence in *AMERICAN FORESTS* regarding Senator Humphrey's wilderness preservation bill. Opposition to this legislation is based largely on four points: (1) that it substitutes single-use for multiple-use policy in the management of the wilderness areas of the national forests; (2) that it freezes the status quo of such lands so that it can't be changed without Congressional action; (3) that it substitutes political for professional control of wilderness areas; and (4) that it is unnecessary.

Let me comment on each of these points. **First**, land zoned for management as wilderness serves four different uses—production of water, production of wildlife, recreation, and scientific research. While only two of these involve consumption of physical resources, all four uses are important and certainly constitute multiple-use management.

Second, the Humphrey bill provides that orders of the Secretary of Agriculture making additions to or deletions from national forest wilderness areas shall be transmitted to Congress and shall take effect after 120 days of Congressional sessions, unless either house shall have passed a resolution of disapproval. Surely this does not freeze the status quo. The Forest Service, through the Secretary of Agriculture, can continue to initiate changes which will go into effect

unless Congress exercises a veto power. No affirmative Congressional action is required.

Third, under the present Regulation U-1, the political Secretary of Agriculture establishes, modifies, or abolishes wilderness areas upon recommendation of professional foresters. Under the Humphrey bill the same arrangement would continue except that the political Congress would have an opportunity to veto the order of the political Secretary. Thus there is no substitution of political for professional control. In a democracy it is quite proper to vest ultimate control in the representatives of the people, with the professional administrator responsible for recommending action.

Fourth, the question of whether the proposed legislation is necessary is, of course, a matter of opinion. Those who look upon wilderness areas as a temporary status for timber reserves not immediately needed will probably oppose this bill because they think it would make it harder to get at the timber when wanted by the wood-using industries. Those who believe wilderness preservation is so important that it deserves the weight and dignity of legislative rather than administrative policy, and who prefer to have ultimate control of wilderness in the hands of officials democratically responsible to the people, will support this bill.

Philip J. Stone
3023 Macomb St. N.W.
Washington 8, D. C.

Making People Think

EDITOR:

I have read your statement and think it a very good one. . . Neither your statement nor mine will damage the wilderness philosophy; both will make people think, and that is the most important thing there is in conservation today. I tried to keep my statement on a high plane and you certainly accomplished that feat.

Ernest Swift
National Wildlife Federation
Takoma Park,
Washington 12, D. C.

Salute to Mr. Pfeiffer

EDITOR:

Having served on the staff of the Maryland Department of Forestry and of the University of Maryland in the late 20's and early 30's I had more than a passing interest in the recent issue of *American Forests* which chronicled some of the important landmarks in the half century of state forestry operations. With a few of these events I had had personal experience; reading about others helped to gain a better understanding of recent work.

In the telling of this story your writers appeared to give emphasis to the theme

NEXT MONTH

"Is forestry being squeezed out in the battle for brains?" That is the question Prof. Otis F. Hall, of Minnesota, asks in the March issue of *American Forests* in his article, "The Manpower Shortage in Forestry." Also Editor Arthur B. Meyer's factual feature for young people "Forestry As A Profession."

Operation Outdoors

Recreationists Hail Five-Year Program
Announced by Department of Agriculture

THERE was good news across the breadth of America for recreationists last month as the U. S. Department of Agriculture announced that "OPERATION OUTDOORS," the big plan to double picnicking and camping facilities on national forests within the next five years will be started this year.

The five-year plan was released following the President's budget message to Congress which recommended financial support of the project. It follows on the heels of the "Mission '66" program of the National Park Service which was launched last year with great public acclaim. The OPERATION OUTDOORS program results from the department's study of various Congressional and public proposals to balance recreation facilities with mounting use. The estimate is that recreation visits to the forests will hit the 66 million mark by 1962.

OPERATION OUTDOORS is a double-barrelled program. First it aims at solving the problem of ever-increasing family outdoor activities such as picnicking and camping in the national forests—all which will be good news to the large-family tide in the U. S. A second part will deal with improvement and management of wildlife habitat in cooperation with state game departments. The report released last month deals only with the family-type recreation program and is designated Part 1. Part 2 will be released later.

Some 2,150 new camping and picnicking grounds which will accommodate 40,500 additional families at a time are called for in OPERATION OUTDOORS. Tables and fireplaces are to be repaired and sanitary facilities modernized on the 4,900 camp and picnic grounds which now can properly accommodate only 41,400 families. As in the past, it will be left to private capital to provide and operate resorts and other special facilities in the national forests.

"OPERATION OUTDOORS is geared not only to correct existing unsatisfactory conditions at national forest recreation areas but also to meet foreseeable use during the next five years," R. E. McArdle, Chief of the Forest Service said. "At the same time, however, we must keep recreation in balance with the use of other national forest resources, such as water, timber and forage. The American people are seeking outdoor recreation more than ever before. The national forests are feeling this boom with a tremendous increase in visits. Our existing facilities simply can't handle the load."

Recreation visits to national forests hit an all-time high of 45 million in 1955 compared to 18.2 million in 1946. About 39 percent of the people camped and picnicked outside improved areas because existing facilities, largely built by the CCC between 1933 and 1941, could not take care of them.

The Eisenhower budget proposes an increase of \$7,748,100 for national forests recreation, or more than double that of last year. Total proposed for national forests recreation is \$11,500,000.

that progress has been achieved through the leadership of men, which indeed it has, and not a few of them are named. But no-where in the mainstream of the story did I see a single reference to a man who for over 40 years has contributed faithful and effective effort in the building of the forestry record achieved in Maryland. I refer to Karl E. Pfeiffer. In fact, I did not find his name anywhere. You may correct me by pointing to some tailend paragraph I may have failed to note; certainly there is no reference which does justice to his unbroken record of service.

It may be that my 37 years of membership in the Association confers no special rights to comment on what is printed, or on what is left unwritten, but I must say, I personally feel this is an unjustified slight to Mr. Pfeiffer. From my own knowledge of his work I am certain it would not have been difficult to identify and describe a few of the many solid contributions he has made. I feel certain, too, there is a great number among his friends and his fellow foresters who share my feelings about what patently appears to have been a studied effort upon the part of some individual or group to apply to him the "silent" treatment.

Fred B. Trenk
2606 Gregory St.
Madison Wisconsin

(Editor's Note—The editor of *American Forests* must assume the full responsibility for what was an unintentional but nevertheless inexcusable oversight in reference to Mr. Pfeiffer's splendid contribution to Maryland forestry.)

The Other Side of the Picture

EDITOR:

In the Article in *AMERICAN FORESTS* for September, Mr. M. D. Bellomy extols the practice of leasing national forest land for summer homes. That this practice is of great benefit to the possessors of these privileges, and has certain advantages to the forests, is conceded. But a word of warning is not out of place.

A lease for a forest homestead is the exact equivalent of a grant for permanent occupation of public property for private benefit; the equivalent, for in no case, to my knowledge, however desirable in the public interest, has any homestead lease been cancelled despite pressure and agitation for their discontinuance. The improvements thus constitute a vested right, in return for a nominal annual rental to the government.

Mr. Bellomy states that to preserve the forest's natural appearance, no homes are allowed within sight of highways or lakes, along fishing streams, or near public use areas or scenic attractions. Even if this is now the policy governing these vested rights in homesites, it was not always thus.

In 1902 the writer was instrumental in securing the Congressional law known as the Morris Act, which provided that on the Chippewa Indian ceded lands at Cass Lake, Minnesota, Star Island and Ten Sections covered with virgin Norway and white pines, bordering Pike Bay and Norway Beach, be set aside as park lands reserved for public recreation. But, behold, there arose a supervisor who "knew not Joseph," and under the dominion of the Denver Office, to which this reservation had been transferred, Ed Marshall decided

(Turn to page 76)

What Every Forester's Wife Should Know ... ABOUT FORESTRY

MISS Alma Dean Fuller, along with other staff members of American Forest Products, Inc., developed this quiz to see just how much the wives of foresters attending the Society of American Foresters meeting in Memphis, knew about

their husbands' occupation.

Of the 225 women who took the quiz, 12 made a perfect score.

If you are a forester's wife why not test your forestry knowledge on this quiz? If you make a score of 12 or better, your husband probably

doesn't now how lucky he is. A score of 7 to 11 qualifies you as an attentive wife, but a score of 6 or less suggests you may have been talking when you should have been listening. For the answers, see bottom of this page.

I. A backfire is a

- (a) a fire intentionally set along the inner edge of a control fire located ahead of an advancing fire.
- (b) a sudden pain in the sacroiliac.
- (c) forest fire that suddenly reverses its direction.
- (d) forest fire at the back end of the woodland.

II. Dendrology is the study of

- (a) wildlife homebuilding.
- (b) insects which attack trees.
- (c) the daytime stars.
- (d) tree species.

III. Inner bark is

- (a) the part of the tree next to the cambium.
- (b) a suppressed growl.
- (c) the heartwood of the tree.
- (d) the part of the tree that is inside the earth.

IV. A hypsometer is

- (a) a scale for measuring land.
- (b) an instrument for those who are reducing.
- (c) a device for measuring the height of trees.
- (d) an instrument for measuring wind velocity.

V. Multiple use of forest land means

- (a) several tracts of land joined by property lines with mutual agreement among the owners as to the use of each tract.
- (b) management of each area in a manner that yields the maximum number of benefits and fits each use to the others.
- (c) the rotation of trees, row crops, and grass every seven years on farm woodlots.

VI. Duff is the technical term for

- (a) the forest floor.
- (b) an elderly forester.
- (c) dust raised by a tractor or vehicle in the woods.
- (d) headgear worn by men who fell trees.

VII. Heart pine is

- (a) a new hybrid tree.
- (b) lovesickness.
- (c) the inactive portion of the wood at the center of a pine tree.
- (d) a pine tree growing in the middle of the forest.

VIII. A Biltmore stick is

- (a) a scale for measuring streamflow.
- (b) a divider to permit drying of lumber.
- (c) a scale for estimating the diameter of trees.
- (d) a souvenir from the Vanderbilt estate.

IX. Liberation is a forestry term meaning

- (a) a cutting made to free young trees from overtopping timber.
- (b) music played in the style of Liberace.
- (c) untangling overgrowing vines from trees.
- (d) removing the bark to expose the fiber.

X. A certified tree farm is

- (a) a commercial nursery which grows certified seed.
- (b) a privately owned taxpaying timber land dedicated to growing repeated crops of timber which has been inspected and enrolled in the American Tree Farm System.
- (c) a park devoted primarily to recreation and wildlife propagation.
- (d) any woodland on which good management is being practiced.

XI. A portable chipper is

- (a) a dishwasher for taking on picnics.
- (b) a machine which converts left-over logging and milling residues into chips for making particle board, paper, soil mulch, bedding, and fuel.
- (c) a new machine which chips the trunks of pine trees for turpentine.
- (d) a flying squirrel.

XII. An increment borer is a

- (a) wood-boring insect characterized by its habit of destroying only the last annual increment (or yearly growth) ring of a tree, thus causing the death of the tree.
- (b) an instrument which measures the circumference of a tree inside the bark.
- (c) a tool used to extract a small core of wood from a living tree for analysis.

XIII. A girdle, in forestry, means

- (a) cuts around the trunk of a tree to kill it.
- (b) a tight binding around a tree which prevents swelling in lower portions of the trunk.
- (c) a restrictive wrapping which makes fat limbs grow longer.
- (d) a tape for measuring girth of a tree trunk.

XIV. Forest pathology is the study of

- (a) trailbuilding.
- (b) insects which attack trees.
- (c) tree diseases.
- (d) water plants.

Answers: (1) a, (2) d, (3) c, (4) c, (5) c, (6) d, (7) c, (8) d, (9) c, (10) b, (11) c, (12) d, (13) b, (14) c, (15) c, (16) d, (17) c, (18) d, (19) c, (20) d, (21) c, (22) d, (23) c, (24) d, (25) c, (26) d, (27) c, (28) d, (29) c, (30) d, (31) c, (32) d, (33) c, (34) d, (35) c, (36) d, (37) c, (38) d, (39) c, (40) d, (41) c, (42) d, (43) c, (44) d, (45) c, (46) d, (47) c, (48) d, (49) c, (50) d, (51) c, (52) d, (53) c, (54) d, (55) c, (56) d, (57) c, (58) d, (59) c, (60) d, (61) c, (62) d, (63) c, (64) d, (65) c, (66) d, (67) c, (68) d, (69) c, (70) d, (71) c, (72) d, (73) c, (74) d, (75) c, (76) d, (77) c, (78) d, (79) c, (80) d, (81) c, (82) d, (83) c, (84) d, (85) c, (86) d, (87) c, (88) d, (89) c, (90) d, (91) c, (92) d, (93) c, (94) d, (95) c, (96) d, (97) c, (98) d, (99) c, (100) d.

ROSS L. LEFFLER

Assistant Secretary of the Interior for Fish and Wildlife

By BETTY FADELEY

ROSS L. Leffler of Pittsburgh, Pennsylvania, has brought to the newly created post of Assistant Secretary of the Interior for Fish and Wildlife, the enthusiasm of a dedicated conservationist and the business acumen of a top executive.

Mr. Leffler had been in office only fourteen days when he told *American Forests* in an interview, that a task force to formulate long-range plans for the Fish and Wildlife Service had begun operations. This task force, scheduled to report March 1, 1957, is also charged with the responsibility of reorganizing the Fish and Wildlife Service into a more efficient group and a less expensive operation.

However, Mr. Leffler said, "Until the task force's report has been submitted and approved, current Service policies will continue."

"There will be no change in the regional office set up of the Service," Mr. Leffler declared. He had previously issued a memorandum to this effect to stop rumors that the Atlanta office, and perhaps others, would be closed under the reorganization program. Rumors such as this invariably permeate government agencies whenever there is a change in leadership.

Mr. Leffler is not unfamiliar with Interior Department activities as he had served on the Conservation Advisory Committee of the Secretary of the Interior since July 1955, and was a member of a survey team which made a study of the Fish and Wildlife Service in 1954.

Throughout his business career, Mr. Leffler has been connected with the steel industry. He started as a timekeeper for the Carnegie Steel Corporation in 1910, and worked his way up in the business to become assistant to the president of Carnegie Illinois Steel in 1947. Later, in 1951, Mr. Leffler was appointed assistant to the vice president for oper-

ations of U. S. Steel Corporation.

In commenting on his new position, which still has to be confirmed by the Senate, Mr. Leffler said, "I think I will find it interesting." This was indeed an understatement as he has been prominently identified with conservation activities for many years, particularly in Pennsylvania.

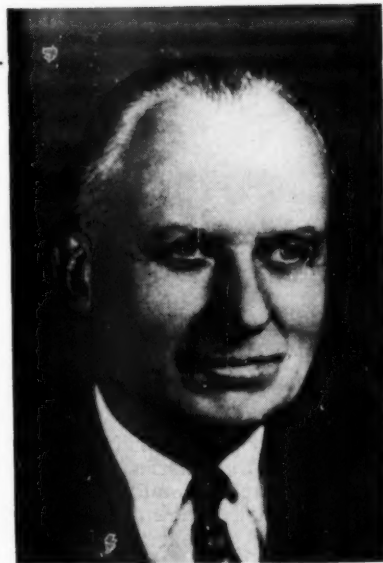
Mr. Leffler referred to the present secretary of the Department of Forests and Waters, Dr. Maurice K. Goddard, as "the best man since Dr. Stewart. He's top notch—might even be better than Dr. Stewart."

In 1927, he became a member of the Pennsylvania Game Commission, and served on the commission for 29 years, 16 of them as its president.

Mr. Leffler helped organize the first Pennsylvania chapter of the Izaak Walton League, and is a former national director of that organization. He was one of the founders of the Federation of Sportsmen's Clubs of Pennsylvania, and has served as president of the International Association of Game, Fish and Conservation Commissioners.

Of all of his conservation activities, Mr. Leffler is probably best known for his efforts to promote conservation programs among the Boys Scouts of America. He first became identified with the Boy Scout movement in 1917, in the capacity of a troop committeeman. Since that time he has served with distinction in numerous positions including president of the Allegheny Council of Boy Scouts, and executive board member and conservation chairman for the national organization.

As a result of his work in scouting, Mr. Leffler has received a number of honorary Boy Scout awards, such as the Silver Beaver, Silver Antelope, and Silver Buffalo. Incidentally, at the last AFA board meeting, the directors passed a resolution commending Mr. Leffler for the valuable serv-



Ross L. Leffler

ices he has rendered for the Boy Scouts.

"The Fish and Wildlife Service will participate in the Boy Scout Jamboree at Valley Forge next year," Mr. Leffler said. "The Service is also planning to increase its conservation activities among other youth groups, such as 4-H and FFA clubs," he added. Mr. Leffler stated that "if you can teach conservation to the youth of America, the program is sold."

Mr. Leffler is also a firm advocate of the wilderness concept. He supports in principle some form of wilderness legislation. "Our remaining wilderness areas must be protected," he said. "The work week is being shortened and more recreational areas will be needed. Ways must be found to protect wilderness areas as it is too easy for people to move in on one pretext or another. Unless drastic steps are taken we might lose them altogether," he continued.

Mr. Leffler was born in Butte, Montana, in 1886, but shortly thereafter his family moved East. He attended primary and secondary schools in Boston, and received his college education at the University of Michigan.



Randolph G. Pack

RANDOLPH G. PACK, president of the Charles Lathrop Pack Forestry Foundation and an internationally known conservationist, died at the age of 66 in Darien, Connecticut on December 25.

Scion of a family which for three generations has been prominently identified with the conservation movement, Dr. Pack carried on his family's tradition by dedicating his efforts to forestry, conservation and public service.

Dr. Pack was the guiding head of the Pack Foundation for almost 20 years. The foundation had been established by his father, Charles Lathrop Pack, one of the small group of pioneers who gave generously of time and money to promote forest conservation among the American people. In 1937, Randolph Pack succeeded his father as head of the organization. The foundation's activities will now be directed by Dr. Pack's brother, Arthur Newton Pack.

Dr. Pack attended Williams College and was a special student at the Forestry School of Pennsylvania State College. Afterwards, he worked as a logger in Montana, and later engaged in lumbering operations in Louisiana. He was also an executive in the American Multigraph Company in Cleveland and in a rubber firm in Providence, Rhode Island.

During his tenure as president of the foundation, Dr. Pack initiated a number of important research

projects, several of which dealt with forest management programs on both large and small timber properties. He was also concerned with improvements in state forestry administration, with land use problems, and helping to clarify research methods in forest economics.

Dr. Pack's activities were by no means limited to the United States. Under his direction, the foundation took a leading part in establishing a forestry branch within the United Nations. He himself was one of the founders of the Mexican Institute for Renewable Natural Resources. In recognition of his contributions in that country, Mexico conferred upon him an honorary membership in the Mexican Society for the Protection of Nature.

He received many other honors in recognition of his extensive activities. In 1945 he was made an Honorary Member of the Society of American Foresters, an honor shared at that time by only three living Americans. And, in 1953 he was awarded the honorary degree of Doctor of Science by the University of Michigan for his work in conservation and rational land management. This degree, given on the 50th anniversary of forestry teaching at the University of Michigan, read:

"Industrialist, apostle of conservation. In no measure have the varied and pressing obligations of a successful business career dulled in him the concern for our forests that is characteristic of his family. Constant application to the problems of conservation and active participation in regional and national movements have led him to a considered philosophy of rational land management and have made his voice one which is heeded in counsel. As president of the forestry foundation which bears the honored name of his father, he has initiated programs of research in which this university has been privileged to participate.

We join with all friends of the land in recognizing the merit of one who does not take lightly the responsibilities of citizenship and has served well the common interest and the public good."

Dr. Pack's conservation activities were extensive, and included: director, Northeastern Forestry Foundation; member, American Citizens Committee for the United Nations Scientific Conference on Conservation and Utilization of Resources; trustee, Conservation Foundation; and member, Ohio Forestry Association. He was president of the American Tree Association, and has served as honorary vice president and director of The American Forestry Association. He was also a member of the National Conservation Committee of the Boy Scouts of America.

Always active in civic work, Dr. Pack was chairman of the Darien Chapter of the American Red Cross, and of the American Red Cross Fund Drive in 1942.

Dr. Pack had wide industrial interests, and this dual background of industry and conservation made him particularly alert to the need for translating conservation concepts into the actualities of the business world. He was also concerned with finding ways of impressing the executive with the fact that his business, just as his life, was dependent on the natural resources, and that their proper treatment was as essential a practicality as the efficiency of his plant or the effectiveness of his sales force.

Of the roles played by Dr. Pack and the preceding generations of his family, Dr. Ovid Butler, director emeritus of The American Forestry Association wrote, "No finer example of family interest and public service, free of any motive of selfish gain, is to be found in the forest history of America."

Washington



Lookout

By ALBERT G. HALL

OUR SOIL, WATER, MINERAL, FOREST, FISH AND WILDLIFE RESOURCES are being conserved more effectively, said President Dwight D. Eisenhower in his annual State of the Union Message to the Congress last month. "Their conservation and development are vital to the present and future strength of the Nation. But they must not be the concern of the federal government alone. State and local entities, and private enterprise should be encouraged to participate in such projects." He placed considerable emphasis on the role of water as a great natural resource, or as a destroyer of life and wealth, and the need for consideration of river valleys as a whole in water conservation and control programs. "Piecemeal operations within each lesser drainage can be self-defeating or, at the very least, expensive." Proper development for the best use of water demands, he said, "the closest kind of cooperation and partnership between municipalities, states, and the federal government." Failure to establish a sound partnership policy would result in excessive cost "by the growth of a stifling bureaucracy, and eventually with a dangerous degree of centralized control over our national life." Thus the partnership philosophy of the Administration was re-expressed, but it must be noted that it was expressed with less vigor than was the case in the early months of this Administration's first four years, and that the development of hydro-electric power by private utilities instead of by the federal government was not stressed.

A REOPENING OF THE FIGHT FOR FEDERAL DEVELOPMENT OF THE HELLS CANYON DAM on the Snake River in Idaho-Oregon was announced by Oregon's Senator Wayne Morse soon after the President's message was delivered, although Representative Gracie Pfoff of Idaho had moved earlier--on the first day of the 85th Congress--to reintroduce her bill for the federal project. As co-sponsors of his measure, Senator Morse has the assured support of 26 of his colleagues--24 Democratic and 2 Republican Senators. The Republicans are Senators Langer of North Dakota and Wiley of Wisconsin. The high federal dam, for which an authorization of \$484 million is asked, was defeated in the Senate last year by a vote of 51 to 41. Supporters of the measure in this Congress indicate their belief that the results of the November election constitute a mandate for reconsideration of the project. In the meantime, private construction of three smaller dams on the Snake River has begun, but efforts are being made through the courts to halt the private development.

DELAY IN THE SALE OF THE LANDS OF THE KLAMATH INDIAN TRIBE in Oregon is being sought by the Secretary of the Interior. Amendments to the termination act have been proposed which would block any sale of Klamath lands until the end of the first session of the 85th Congress. Purpose is to give the Congress an opportunity to reconsider the act of August 13, 1954, which provides for the sale this year of the assets of those Indians who wish to withdraw from the Tribe and take cash settlement for their share of its assets. Principal decision to be made by the Congress is whether the Klamath lands will be purchased by government or be made available, as the law now provides, to private purchasers. (For an analysis of the dilemma facing the administrators of the termination act, see Uproar on Klamath Reservation in AMERICAN FORESTS, January 1957.) Another suggested amendment would provide for extending the duration of the act to August 13, 1961, so that sales of timberland, if not made to the federal government, could be spread out in a manner less disruptive to the forest economy of the Klamath area. The Secretary also proposes that the Congress authorize federal assumption of the costs of the termination

(Turn to next page)

program. The existing law provides that the costs be borne by the Klamaths. Such authority has been granted for a similar termination of federal control over the Menominee Tribe in Wisconsin. (In regard to the Menominee act, Representative Laird of Wisconsin has introduced a bill that would delay final termination of federal jurisdiction until December 31, 1960.) Senators Neuberger and Morse of Oregon, Watkins of Utah, and Representatives Green of Oregon, Miller of Nebraska, and Udall of Arizona have introduced bills to amend the Klamath Act. It is expected that these, with the bill proposed by the Secretary of the Interior will receive early attention. While the move toward federal acquisition is an attempt to assure that the Klamath timber will continue to be managed on a sustained yield and orderly basis, it does not answer the questions of those who believe that many of the Indians will squander their cash settlements and become burdens on the communities to which they move.

HEARINGS HAVE BEEN HELD ON THE OPERATION OF THE SOIL BANK PROGRAM and to receive suggestions for improvement of the program in 1957. Called early in January by Representative Cooley, chairman of the House Committee on Agriculture, the principal interest of most witnesses was in the agricultural aspects of the act. The tree-planting phases of the Conservation Reserve, under which farmers are paid for establishing grass and tree plantations and receive annual rental for specified contract periods, came in for a bit of criticism from the American Association of Nurserymen, the National Christmas Tree Growers Association, and the National Lumber Manufacturers Association. The nurserymen objected to the use of Soil Bank funds for the establishment and enlargement of state forestry nurseries. The Soil Bank act provides for the purchase of private nursery stock to supplement that of public nurseries, but it is contended that this provision has not been used and that public nurseries are being established which will continue to be competition to private enterprise. Christmas tree growers sought assurance that trees planted under the Soil Bank would not be placed on the market in future years in competition with private non-subsidized stock. The lumbermen's association, in a letter to the committee expressed overall disagreement with any further subsidization of tree planting under the program, pointing out that planting for forestry purposes has been increasing steadily without the benefit of payments and that the Soil Bank subsidies would discourage those planters who would otherwise undertake tree growing at their own expense.

ALASKA STATEHOOD PROPOSALS MAY RECEIVE ACTION in the 85th Congress. A number of bills have been introduced by key members of the Senate and House Committees on Interior and Insular Affairs, the committees which will take initial action on the proposal. Alaska has sent an unofficial delegation of two "Senators" and one "Representative" to Washington to help stimulate action. As in the case of the establishment of the western states, Alaska would be granted public land with which to finance its development. The current bills provide for initial grants of land, including 400,000 acres of national forest and 400,000 acres of public domain, and the selection by the new state of an additional 102,550,000 acres of public domain within a 25-year period.

COMMEMORATION OF THE 50th ANNIVERSARY OF THE FOUNDING OF THE CONSERVATION MOVEMENT in the United States is again proposed in a series of resolutions introduced in the House. Similar resolutions were introduced in large quantity in the 84th Congress, but were not acted upon. Since 1957 marks the anniversary of the first conference of state governors (May 14, 1907) at which President Theodore Roosevelt launched a national conservation movement, it is expected that action will be taken this year. The proposals call for the establishment of a National Conservation Memorial Commission to draw plans for appropriate ceremonies. In addition to Congressional members, the commission would include at least 15 representatives of national nonprofit organizations dedicated to conservation of natural resources.

THE WILDERNESS PRESERVATION BILL, about which much has been written in AMERICAN FORESTS, has been reintroduced and referred to the Committee on Interior and Insular Affairs. As in the 84th Congress, multiple bills have been introduced, indicating that the measure has a large number of supporters. At this writing the Senate bill on the proposal has not yet been dropped in the hopper, but it is expected to be multi-sponsored.

Editorial

Forestry Faces A Social Problem

The move to liberate the Klamath Indians in Oregon as provided for by Public Law 587 now appears to have been a hasty and ill-advised action in terms of the best interests of: 1) the Indians; 2) the timber and other resources on the 850,000 acre reservation; and 3) the economy of Oregon.

As set forth by Mr. Anthony Netboy in his article "Uproar on the Klamath Reservation" of last month, the Secretary of the Interior under the terms of the law is directed to: 1) have an appraisal made of all tribal property, showing its fair market value by predictable logging or other appropriate economic units; 2) to give each adult member of the tribe an opportunity to withdraw from the tribe and have his interest in tribal property converted into money and paid to him, or to remain in the tribe and participate in a management plan; 3) determine . . . the portion of the tribal property which, if sold at the appraised value, would provide sufficient funds to pay the members who elect to have their interests converted into money, arrange for the sale of property, and distribute the proceeds . . . and; 4) cause a plan to be prepared . . . satisfactory to the tribe and to the Secretary for the management of tribal property through a trustee, corporation, or other legal entity."

As of this month, February 17th to be exact, the Indians may call for the sale of their tribal assets including the carving up of the last great remaining stand of ponderosa pine in the world—unless Congress moves with dispatch to prevent it. According to reports from Oregon about 70 percent of the members of the tribe will elect to take their money and get out—which means that enough timber must be sold to provide every man, woman and child with approximately \$40,000. Needless to say such a move would wreck the present sustained yield management program on these Indian lands, glut the pine market in Oregon and indeed the whole nation and give forestry one of the worst black eyes it has ever received in 50 years of constant progress. Or to be more specific, perhaps we should say "industrial forestry" would get a black eye since it is at that doorstep that the public would lay the bulk of the blame if this magnificent pine forest is destroyed.

All this would be bad enough in itself. What makes this situation even more distressing is the fact that human resources are involved here—the Klamath Indians themselves—and if reports now reaching us from Oregon are true the bulk of these Indians are no more prepared to assume the responsibilities of citizenship than the aborig-

inal head hunters in the Fly River area of New Guinea. There are today sound and respected businessmen in the Klamath region of Oregon who say flatly that many of these Indians, once they receive their money from the sale of the forests, will promptly "blow it" and thereafter swell the relief roles to unprecedented heights or elect to live on their relatives.

That this sort of intelligence is a far cry from the soothing syrup the public was handed several years ago when PL 587 was enacted is certainly true. The question might well be asked "Where were the people responsible for looking after these Indians, their rights, and their resources two years ago?" when Congress, in good faith, enacted a law to end the Klamath tribe's status as a ward of the state and to presumably welcome them to both the privileges and responsibilities of first class citizenship. The report that was presented to the public at that time was that the Indians were ready.

Well, they aren't ready. Authority for some of this new evidence that today is reaching Washington comes from the team of management specialists appointed by the Secretary to remove government supervision over the Klamath tribe by August 13, 1958. Instead of starting removal of such supervision, this team was in Washington last month declaring that unless prompt action is instigated, the law, as presently set up will do irreparable damage to the Indians, their resources including the timber held in trust for them, and the economy of the region.

All of which prompts us to ask isn't it about time that we started putting a little more emphasis on this business of educating the Indian and preparing him to take his place in society and a little less emphasis on this business of separating him from his assets? Forestry, in our judgment, faces a social problem here and it ought to move fast. We don't know the answers to this problem either, but one thing that we can do is to get behind the Morse-Neuberger Bill (S 469) and the Ullman Bill (HR 2518) to freeze this whole Klamath problem right where it is for 18 months to give us time to decide whether to repeal the whole Klamath Bill and be done with it or decide on any other proper action.

There isn't much time but those two bills provide a stopgap answer that will fend off liquidation until we can decide. The American Forestry Association was moving last month with all possible speed in urging the enactment of these bills to give our Board of Directors time to come up with a permanent and constructive final solution.



De luxe cabins, such as this one at Bluestone State Park, range in price from \$45 a week for two to \$105 a week for eight

PAY-AS-YOU-GO STATE PARKS

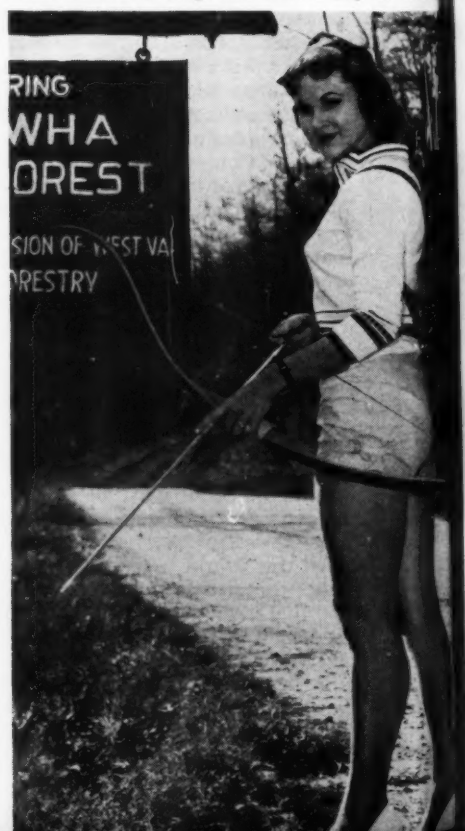
By E. JOHN LONG

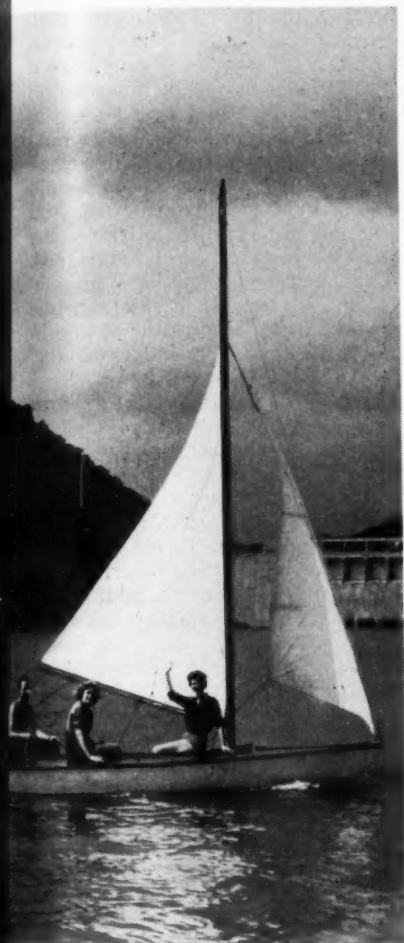
Convinced that vacationers would pay fees for improved accommodations in parks, West Virginia's revenue-bond program will develop facilities and make them self-supporting

Living room and kitchen of six-room de luxe cabin, Bluestone State Park



Some archers average two deer a day in W. V.





Impounding lakes big enough for boating has enhanced several state parks

IN colonial times the area that is now West Virginia was a magnificent wilderness of forest-clad mountains, rich in game and fish, a happy hunting ground for Indian and white settler alike. George Washington, who surveyed many sections of it as a young man and who had extensive property holdings along the Great Kanawha, extolled its virtues and brought specimens of its trees back to plant at Mount Vernon.

During the late 19th Century, however, misguided timber practices all but stripped these verdant slopes of their original growth to meet the demands of mines, housing and manufacturing. Insects and other blights, soil erosion, fires and storms threatened to leave a blackened wasteland where once all had been a cheery green.

Fortunately a wise conservation policy, initiated by both state and private interests about 40 years ago,

has vigorously reversed the trend. Today some 900,000 acres of West Virginia woodland are either state or nationally operated as recreation grounds for the public, or as a stockpile of timber reserves for cutting under modern forestry management laws.

These flourishing areas represent about one-tenth of the state's timbered lands, all of which have benefited from a long range program of conservation. Thanks to intelligent timber management and the pre-war efforts of the Civilian Conservation Corps, one person in ten in the Mountain State again earns his livelihood from the products of its hardwood forests. Income from all types of timber in West Virginia is now at the rate of \$100,000,000 annually, which is a right good sum when one considers that "Doubting Thomases" in the lumber industry had given the state up for lost less than a half century ago.

While West Virginia has no national parks, the Monongahela National Forest is completely contained within the state, and some 97,000 acres of the George Washington National Forest lie along the eastern border. In addition, there are ten state forests.

But the pride and joy of the Conservation Commission of West Virginia are a score of recreational state parks, scattered strategically about the mountain tablelands of the state. All of them were selected for their natural silvan beauty, enhanced in some cases by man-made reservoirs or lakes, or an historic site. All offer wholesome outdoor living and fun, whether it be a few hours diversion on a weekend, or complete vacations. Six of them stay open throughout the year.

With the expansion of the motor age and the advent of super-highways, West Virginia realizes that its recreation areas lie within a day's drive of half the population of the United States. But most tourists do not want to sleep outdoors nor eat over a campfire. Other resort areas have led them to expect more comfortable facilities, such as lodges serving meals, modern well-equipped cabins, swimming with bath houses, boats for hire, and plenty of stout picnic tables and outdoor fireplaces.

West Virginia, like many other states, has found that while it is comparatively easy to get land for parks and recreation areas, it is another matter to obtain the funds needed to fix them up. Legislators

usually take a dim view of regular tax money being spent for *improvements and maintenance*—except for places within their own districts!

Conservation men in West Virginia were convinced, judging from the waiting list for a few facilities inherited from C.C.C. days, that vacationers would gladly pay fees that would cover both improvement and maintenance of even better accommodations. But they could not find private capital willing to chance the original investment, even though official figures showed that tourism had advanced into third place among the state's industries (after coal and manufacturing).

The 1953 Legislature took a cautious step forward when it authorized the Conservation Commission to sell revenue bonds for the development of single parks. The only state park that then was a revenue-producer was Cacapon, near Berkeley Springs. It was soon apparent, however, that bonds to develop other parks could not be sold unless Cacapon were joined with them in a feasibility report and over-all expected-revenue plan. In other words, bonds would have to be sold on a state-wide park expansion plan.

Carl J. Johnson, able and energetic director of the Conservation Commission, took his problem to the



Ski tow at Cabin Mt. is used by guests at Blackwater Falls State Park Lodge

sympathetic ear of Governor William C. Marland. The Governor, recognizing the legal and fiscal obstacles, put the state park program at the top of his 1955 list. On January 17, 1955, in his "state of the State" message, he appealed to the West Virginia Legislature to enact a law that would enable all seven of the then existing state parks to benefit from the sale of revenue bonds, with the object of making them self-supporting

through fees or concessions. The Senate promptly approved the project 31-0, and the House later made it completely unanimous by a 93-0 vote.

To work out the details, the Commission retained the Walter Butler Company, architects, engineers and construction managers of Saint Paul, Minn. Its report presented construction costs, breakdowns of revenue from existing facilities, reviews of past gross revenue and attendance figures, estimates from new parks, operating budgets, maps, etc. Walter Butler Company's financing affiliate, the Builders Trust Company, financed a \$3,100,000 revenue-bond issue, and, within a matter of weeks, preliminary construction work toward a self-supporting park system had begun. Repayment of bonds, from income, was spread over 25 years.

First to receive refurbishment was Cacapon, with its already established tourist clientele. Here a modern half-million dollar lodge, with 48 rooms and a restaurant seating 250, was built not far from the existing 11-room lodge. The latter is now available for group occupancy, such as Scouts, Four-H Clubs and others. Eleven de luxe cabins supplement 19 previous cabins. In addition, there is a commissary, riding stables, and a six-acre lake for swimming, boating and fishing—all on a fee basis. Outdoor fireplaces and picnic tables, however, are free to the public, as are also miles of hiking trails through nearby mountain forests.

At Blackwater Falls State Park, near David in Tucker County, about a third of the total bond issue is being expended in what is expected to be "the Skiing Capital of the Southland." An altitude of 3,000 feet gives this park a climate somewhat like that of southern Canada,

—delightfully mild in summer and plenty of snow for winter sports from late December to mid March.

In addition to a new 55-room main lodge, Blackwater has 25 house-keeping cabins, a 300-person restaurant, tent and trailer areas, riding stable, playground, and a dam creating a 12-acre lake for summer swimming and fishing, and winter skating. Blackwater's chief attractions are two nearby power-towed ski slopes, one on Cabin Mountain and the other on Weiss Knob.

This new park, whose lodge was dedicated in January 1957, lies a few miles south of US 50, which is kept open to motor traffic throughout the year. The mainline of the Baltimore & Ohio Railroad from Washington to Cincinnati also passes nearby. Express trains stop at Oakland, Md., which is only 5½ hours out of Washington.

A third lodge, Mont Chateau, is scheduled for opening later in 1957 at Cooper's Rock State Forest Park, near Morgantown, W. Va. Once the mountain retreat of the Duquesne Club of Pittsburgh, it will also be operated the year around, featuring skiing and skating in the winter, and swimming and fishing in the summer months. When the renovation is completed, Mont Chateau will have 40 rooms and a 150-person restaurant.

The present pay-as-you-go revenue-bond program also includes the building of an additional 70 de luxe cabins in several others of the state's 21 parks, bringing the capacity of the system up to 1,000 guests per day when all units are in operation. In addition to Cacapon, Blackwater Falls and Cooper's Rock, three other parks will be kept open on a year-round basis.

A common question is "Why must the cabins be de luxe, that is, with

heating, plumbing, and other modern conveniences?" The Conservation Commission has a ready answer. It isn't difficult to "sell" a man on a vacation of fishing and loafing in the mountains under the most primitive conditions. But if the lil' woman has to chop wood, cook on an old stove, and carry water—well, you just are not going to attract many families, the Commission has learned. The modern woman likes to commune with nature, all right, but she wants a little leisure time to join in the boating, fishing and swimming, too.

To those familiar with weather-beaten shacks, once the only shelters available in wilderness areas, the new \$9,000 "huts" of the West Virginia parks are a revelation indeed. Clean, comfortable and chore-saving describes them. Modern kitchens with running water, electric lights, heating units in addition to fireplaces, and comfortable beds and other furnishings help to make "roughing it" a real pleasure. Wide picture windows offer pleasing vistas even on rainy days, plus closeups of deer, squirrels, rabbits and other wild creatures of the forests.

All facilities are accessible by motor car. In most places roadways, branching off West Virginia's excellent main highways, lead right to cabin doors. Park commissaries and supply shops make long trips to village stores unnecessary.

While certain facilities are handled on a concession basis, cabins must be reserved in advance through application to the Conservation Commission at Charleston. Rates for de luxe cabins in Cacapon, Blackwater Falls, Bluestone, Tygart Lake, Lost River and Watoga State Parks in 1956 ranged from \$45 a week for two, to \$105 a week for eight per-

(Turn to page 73)

Cacapon State Park Lodge was built in 1956 as part of program to improve park accommodations

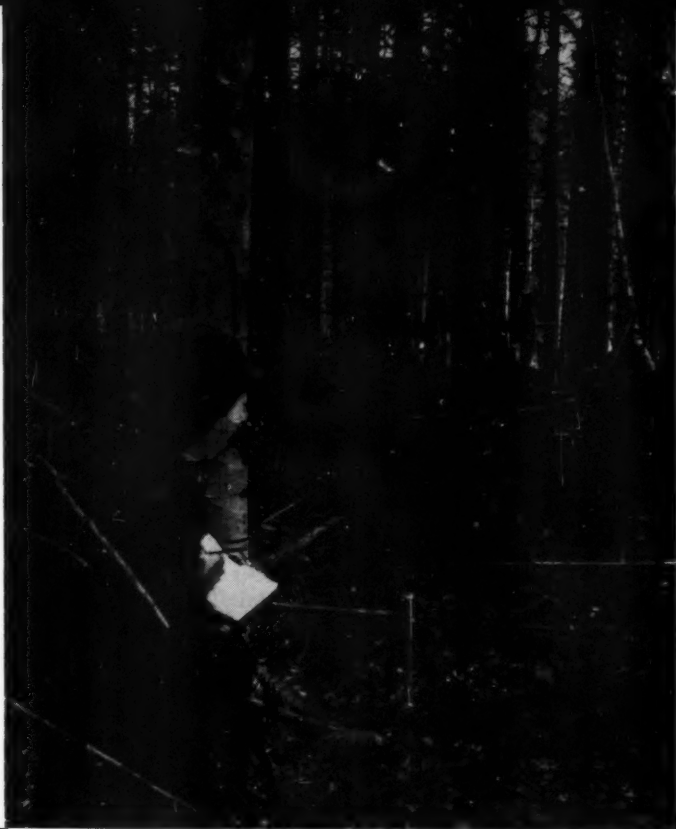


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By HENRY S. KERNAN

THE widespread ownership of land has always been a most potent factor in the American character and history. The urge to own land drew settlers to our shores and catapulted them westward into a vast and empty continent with a daring and fortitude that stagger the imagination. Now, though the frontier has long since closed and the Homestead Act is scarcely operative, an American can still, with relatively little trouble and expense, become an owner of land. Moreover, an amazing number of us do become owners and thus share in a privilege not available to the bulk of the world's population of landless peasants.

One direct result is that American forests are not owned primarily by the government, or communities, or large absentee landlords, or industries, or any other category which might seem, at first thought, to be prone to such investment. Our for-

Kernan considers his land a fine place in which to live and practice forestry

10 YEARS IN A WOODLOT



ests are owned primarily by some four and a half million American citizens. Who they are, why they own forest land, and what they do with it are questions pertinent to the knottiest one of all; namely, how can four and a half million small and separate ownerships be brought to the high degree of intense and skillful management that our economy demands?

Education, say some. Demonstration, say others; economics of supply and demand, regulation, or cooperatives. Each cliché has advocates who can point to some examples of success. But the problem remains to plague the otherwise proud history of forestry in America. Moreover most of those who discuss the point are not of the four and a half million themselves, but are specialists in influencing opinion—a situation quite understandable in a highly complex society such as our own.

Nevertheless, it is as a small land-

His forest includes the white pine-oak, the northern hardwood, and spruce-fir

owner that I now write and describe the forest I own and manage.

Ten years ago I joined this much discussed company of economic individuals by acquiring 1200 acres of forest or potentially forest land. My motives were an interest in forestry, a desire to put down roots in my native state, and to invest safely and profitably.

My land straddles a small branch of the upper Susquehanna in Otsego and Delaware Counties, New York. This little creek, the Charlotte, runs northeasterly throughout a thirty mile course diagonally across the rolling uplands of the Alleghany plateau. Its meanderings have built up a rich and level floor of dark, brown loams. Cleared a century and a half ago, they now support rank crops of corn, oats and clover for the dairy herds.

One side of my valley is a long, gently rising slope turned toward the southern and eastern sun. Dry, open and light, the forest cover runs heavily toward red oak and white pine. Here were the back pastures and fuelwood lots of the early valley farms. On the other side, the sweep

trout in the creek; beaver and muskrat along the banks. There are bluegills and pickerel in the lake, whose surface and boggy shores are a magnet for migrating ducks and woodcock. Altogether it is a fine piece of America, a fine place to live and to practice forestry.

For one thing, certain hinderances to management are no longer serious in this section. The state of New York looks after fire protection and roads. Private enterprise develops the contractors and markets that absorb what the forest will grow. Other problems can therefore engross the attention of the manager.

The first problem is how much, when and what to cut. With regard to points one and two, my rule is simple but quite adequate. Each year I cut enough to pay the taxes and to earn 6% on the invested capital. The amount of stumpage needed each year is about thirty thousand board feet, an amount considerably less than the growth on a thousand acres of forest. The resulting build-up in growing stock is a capital gain to be taken when needed. The net increment is increasing as the many

If the owner is not content with a process so slow, he can do much to speed it on with an axe, saw and planting bar. He can plant the old fields which often go along with an old farm and a woodlot. Reforestation has become an enormous business in this country, as it naturally would given the history of land use. Consequently methods are rather well standardized. My own preference is to use fast growing trees like red pine set eight feet apart. They speedily bring about the forest environment and thus allow the indigenous species to re-coup the land. At other seasons than spring and fall, the owner may choose to work in older stands. Here he girdles or poisons the wolf trees and culls, fells the weed trees, thins out the pole stands, or prunes the straight young spruce and pine. In every case, his object is to concentrate the growth potential of the soil on the best stems—the straight, the sound, the fast-growing and the valuable.

Such work requires an investment of time, interest and money. It requires faith in the growth of trees and in the demand for wood. Ten years in my woodlot have convinced me that such faith is well justified. Personally, I know of no greater pleasure than such work, or a better expenditure of the extra time that others choose to spend in a thousand and one other recreational ways. Hence my usual companion is not a rod, or gun, or pair of binoculars, although I own and enjoy them all; but a razor-sharp, hickory-helved, three-and-a-half pound axe.

The fact is that there are other values in the woods than the annual rings. Real acquaintance with them, the loving care, the passionate interest and delight in the changes and details of a forest, come with the passage of time and the observance of them day after day in the several seasons and times. Now they are drenched with fog and rain. Now they are stark with the harsh cold of winter and the trees are snapping with frost. Now they are bathed in the golden balm of a midsummer day. Under foot the crisp, new-fallen leaves cover the dank and moldering layer of the year before. Around all is movement and change. Overhead the crowns are heaving and the trunks are swaying. The same wind drives on the clouds, shakes the branches and catches up the falling leaves in one last wild, whirling dance. The little waves on

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Motivated by an interest in forestry and a safe, profitable investment, the author has operated his forest lands with the high degree of intense and skillful management our economy demands

of Quaker Hill rises in a series of shale ledges. On the talus is a strip of old hemlock. Above, the northern hardwoods hold sway, the maple and beech in profusion with a scattering of ash, basswood, cherry and birch. It is a damper, denser forest, but almost clear of underbrush.

Beyond the brow of the hill are comparatively level uplands. Here the quality of the fields and woodlots is lower than elsewhere because of the heavy, poorly drained, and acid soils. Remnants of farm days abound; but the last unit sold out twenty-seven years ago. At the height of cultivation, only the swamps were left uncleared, swamps of red spruce, black spruce and balsam fir. One of these swamps has a picturesque spring-fed lake whose outlet drops over the shale ledges to join the creek in the valley far below.

My forest thus includes three types; the white pine-oak, the northern hardwood, and the spruce-fir, but in all conceivable mixtures and age classes. Deer, partridge and small game abound. There are

pole stands come into commercial size and as the dead, overmature, and cull trees are removed. The latter categories can fill out the cutting budget without tapping the growing stock at all. This summer, for example, a pulpwood crew has been working through the spruce stands to remove the dead, diseased and wind-thrown trees. Their operations represent no extra forest drain, and yet have netted over \$700. Altogether in the last ten years, I have sold 293 thousand board feet of logs and 189 cords of pulpwood, and have realized a profit of \$3,794.29.

Protection and careful cutting can bring forests a long way. The deep-rooted, healing force of nature works to wipe out the scars of ugliness and abuse. Every woodlot, no matter how wretched it appears, carries with it the seeds of a sound, fully-stocked stand of trees. The soil becomes deep and porous, the culls drop out, seedlings appear and develop into saplings and poles. Before our very eyes they recreate the beauty of the forest.



The Flying Meathook

By JAMES B. TREFETHEN

WHILE attending the University of Massachusetts back in the post-war forties, I lived for a while in an isolated 200-year-old farmhouse situated five miles from the nearest paved road in the forested hills of Shutesbury. For one embarking on a career in the field of wildlife management it was a splendid place in which to live. There were deer in the neighboring woods and in the overgrown orchard behind the house, snowshoe hares in the lilac bushes beside the back door, and a frozen trout stream in front.

But for all its personal appeal to me, the place was a wild and lonely spot for my town-raised wife.

One February night, I had stayed up late to cram for an examination. It had snowed off and on during the day and the wind was racking the timbers of the ancient building as I closed my books and turned in for the night. As I pulled the blankets around me, the whining of the wind was drowned by an anguished shriek that rose in pitch and crescendo and ended in a strangling gasp. Even I, who had heard the sound before,

was startled. My wife, blankets and all, rose a full foot off the mattress with every hair straight and stiff. It took a full hour, three aspirin tablets, and a double shot of medicinal whisky to convince her that *that noise* was nothing but the love song of the great horned owl.

The horned owl has a wide repertoire of calls, ranging from the doleful hooting that is familiar to anyone who has spent much time in the woods to gentle clucking sounds; but when it screams the sound is one calculated to frighten a banshee or to chill the blood of a lion.

Just why this ungodly shriek should be appealing to the female of any species, only a female owl could say; but apparently it serves its purpose, since great horned owls are still doing well wherever adequate nesting sites and hunting grounds are available to them. This weird cry forms the only concrete basis for a thousand more wild tales of ghosts, spirits, and misplaced mountain lions than any other sound in nature. There is some disagreement among scientists as to whether this is a mating call or a hunting call, but it is most likely to be heard during the winter months when the owls are looking for nesting spots. The horned owl nests shortly after the turn of the new year, and as early as November in the deep South. In the northern states it is not uncommon to find downy young in a nest with two or three feet of snow still blanketing the ground below the nest tree.

The great horned owl is the bad boy of the owl family. If it were not for its depredations against poultry and game, the owls probably would have been rated as highly respectable citizens of forest and field, and welcomed guests in any farm-yard. Back in the days when our ancestors were scrubbing a living out of the forest clearings of New England and Virginia, and when Ohio was "way out West," the old boys had little time or inclination for bird watching. Birds were either good or bad, depending upon the farmer's experi-

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Great horned owl, with the terrifying shriek, is the "black sheep" of owl family



Industry Grows Trees



Each year approximately 1000 high school students spend three days at the Trees for Tomorrow Camp studying forestry on-the-spot. Here, students use tree planting machines

MANY Americans, including school teachers, high school pupils, college students, farmers, industrialists, civic leaders and others, are planting trees on an unprecedented scale. So well are these citizens doing their job that the United States Forest Service estimates that through government, public and private efforts, this nation's forest lands are growing timber faster than it is being used, by approximately 32 per cent. Twenty-five years ago we were cutting 80 per cent more timber annually than we grew.

But there is much more work to be done, Richard McArdle, chief of the Forest Service, warns. Although we are making large gains in pulpwood species and other types of woods not used for sawlogs, the cut of saw timber still exceeds growth. And much of our very best timber is in remote locations where it is difficult and expensive to harvest.

If per capita consumption of wood and wood products remains at present levels, timber output will have to be more than doubled by the year

By AL P. NELSON

2,000 to meet our nation's demands. We have 115,000,000 acres of forest lands which are poorly stocked and need further attention or protection. In addition, some 5,000,000 acres need replanting. Forestry experts say that much of the additional production must come from small forests and farm woodlots, which make up 75 per cent of the commercial forest lands in this country.

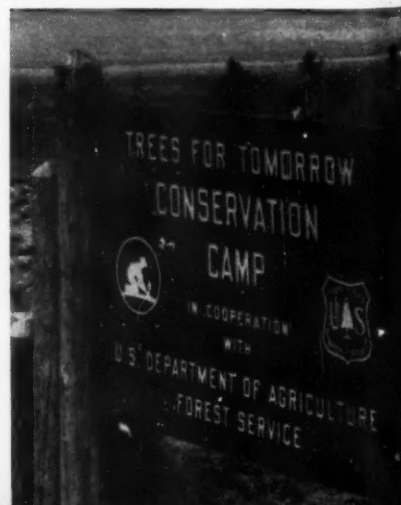
The size of the job can be measured by the fact that there are 4¼ million different persons who own woodlands less than 5,000 acres in size. This means that small land owners the nation over need to be educated in profitable forestry management.

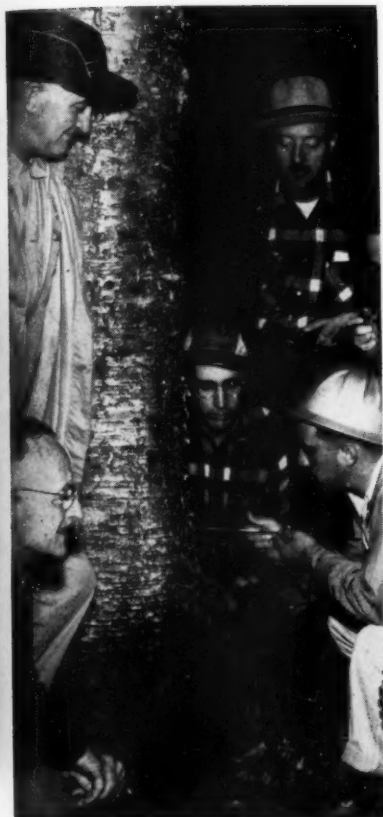
In the past, many varied approaches have been launched to sell small land owners on sound forest management. Some have been successful, but many others have failed. From an industrial point of view, one of the most outstanding of the going programs of forest management is the 11-year-old Trees for Tomorrow, Inc. This is a non-profit

organization sponsored by twelve large Wisconsin paper companies and five power firms vitally interested in a sound forest economy. Quite a few bankers are now aiding the program, too, by buying and lending tree planting machines to small land owners in their areas.

Since its inception in 1944, Trees for Tomorrow, Inc., with headquarters at Merrill, Wis., and a

Trees for Tomorrow established a camp, school, and laboratory at Eagle River





Newsman shown on annual camp tour, sponsored by the Wisconsin Press Assn.

large outdoor camp, school, and forest laboratory at Eagle River, Wis., has distributed free more than 6½ million tree seedlings, mostly Norway and jack pine and white spruce, to more than 5,000 land owners, prepared detailed tree management plans for 140,000 acres owned by 360 persons, and instructed 17,000 people in forest resources management, some for college credit. And the work goes on.

Each year approximately 1,000 selected high school boys and girls, spend three days in the Trees for Tomorrow camp studying forestry "on the spot" at the "garden of nature." Some of the pupils come on a scholarship basis; others pay a small fee for the three day school, which includes instruction, board and room.

Largely because of the experience and enthusiasm gained at the Trees for Tomorrow camp, high schools in Wisconsin have increased their school forests to 256. Forestry courses are flourishing in many high schools, teaching tree management to youngsters who will benefit from such a far-reaching program.

It was to be expected that when industrialists tackled the forest renovation problem in Wisconsin from an educational and public service angle, they would approach it with the same basic procedure of study, experiment, adequate financing and long-range application which has come to be termed by many foreign observers as the "American know-how."

In fact, Folke Becker, president of Trees for Tomorrow, Inc., highlighted this approach recently in a speech to business men. "We believe that forests can be grown," he said, "not by talking about them, but by planting trees, and that conservation can be learned not from books alone but by studying resources actually at work in their natural setting."

The paper company executives had had some valuable experience in making forests grow and knew what they were talking about. The supporting sponsors of Trees for Tomorrow own and manage 75 per cent of the industrial forests in Wisconsin, once a greater timber producing state. In the past few decades the paper executives have

Paper Co., Whiting Plover Paper Co., Mosinee Paper Mills Co., Marathon Corp., Wausau Paper Mills Co., National Container Corp., Tomahawk Paper Co., Rhinelander Paper Co., Kansas City Star—Flambeau Paper Division, Wisconsin Public Service Corp., Charmin Paper Mills, Inc., Badger Paper Mills, Inc., Wisconsin—Michigan Power Co., Chippewa and Flambeau Improvement Co., Lake Superior District Power Co., Nekoosa Edwards Paper Co., and Wisconsin Power and Light Co.

The philosophy behind Trees for Tomorrow, Inc., is one of self help. The objectives of free tree distribution, the key to the entire plan, are:

1. To interest more people in reforestation.
2. To provide technical assistance (such as planting trees and dispensing tree care data.)
3. To achieve a carry over effect whereby land owners will buy seedlings from the state of Wisconsin after receiving free trees for two years.

For the past few years this organization has been distributing



Primarily due to the experience and enthusiasm generated by the camp, the number of school forests in Wisconsin high schools has increased to 256

planted a total of 45,000,000 trees on their 500,000 acres of company owned land to assure a future supply of pulpwood for paper making. Bulwarking this potential supply for specialized industrial purposes, is the great public interest in conservation, including better forestry management, generated by the Trees for Tomorrow program.

Companies which are members of the Trees for Tomorrow, Inc., are: Consolidated Water Power and

over 500,000 trees each spring. Trees which were planted in 1944 and 1945 are now from 12 to 18 feet high. These growing timber lands, shown to interested persons on tour, give a practical idea of how valuable timber crops can be. Many Wisconsin farmers, especially in the northern half of the state, are now setting aside definite acreage on which to grow timber as they would alfalfa, corn, oats, or potatoes.

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Tornado in the Pines

Tangled trunks have made the famous
"Longfellow Trail" almost impassable

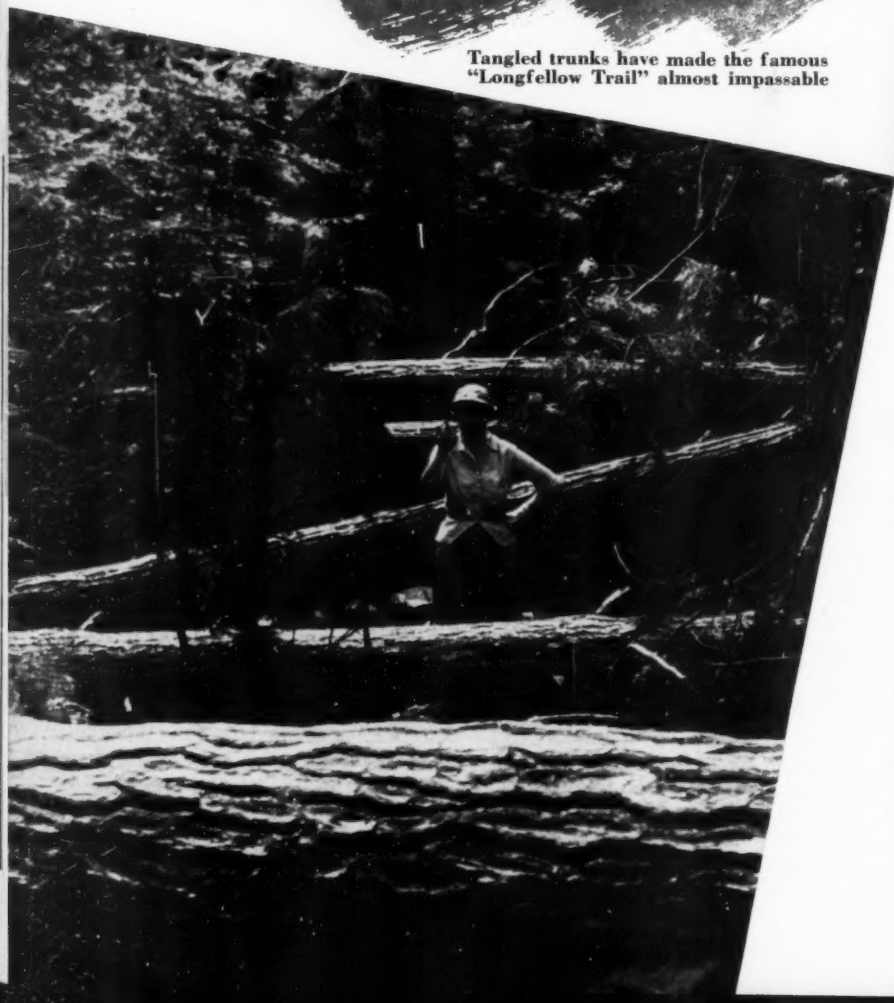


The break of this "giant" reveals
twisting force of wind

By DON NEAL

GREAT giants of the forest, stately pines and revered hemlocks, some of which could have been staunch saplings when the first white man drifted his way down the Clarion River on his way to the westward flowing Allegheny, came to their untimely end this past August. In a period of less than five minutes on August 18th, some three hundred of these forest monarchs splintered, snapped, twisted, and crashed to the ground in a wind-fury that swept its way through the haloed "Cathedral of the Pines" in Pennsylvania's Cook's Forest Park.

Long a haven of the nature-lover and that special breed of men who infinitely love the forest primeval, the "Cathedral of the Pines," a large



An outward appearance of strength belied the true weaknesses that existed within the giants of this virgin forest, as one short burst of violent wind-fury transformed the magnificent, awe-inspiring "Cathedral of Pines" into a shamble of green wreckage

tract of virgin forest, has been the "attraction" at the huge 6,799-acre state park that straddles the low, rolling hills of the mid-Clarion watershed in the west-central part of Pennsylvania. And for a number of years, ever since the turn of the century, the matter of preserving this virgin forest in its original beauty has occupied the interests of thousands upon thousands of conservationists. And rightly so, for the area has attracted visitors from all parts of our continent and on many occasions has been visited by world travelers who came to see one of the few remaining stands of towering, world-famed timber that furnished tall, straight masts for the ships of the seven seas during the "wind-jamming" 1800's.

And it is little wonder that the visitors, and the travelers, were inspired by what they saw. Trees, not a few, but many, rose straight and true to heights of 150 and 200 feet. So majestic, so awe-inspiring, so reverently beautiful were these trees standing in all their sylvan glory that even dedicating them as the "Cathedral of the Pines" seemed inadequate.

Now, all but a very few of them are gone—destroyed—in one short burst of violent wind-fury that swept its way through the area leaving this once dedicated plot a shamble of green wreckage.

It was close to 7 p.m. on August 18th, according to an eye witness, Vernon Sones, an under-graduate forestry student at Pennsylvania State University, when the "twister" came out of the southwest and ripped its way through the stand of virgin timber. Actually, the storm, its wind and rain, lasted some fifteen minutes; but according to Mr. Sones the damage was completed in less than five minutes. Twisting, snapping, cracking, splintering, some 300 of the stand's largest trees crashed to the ground. Some were torn out by root, while others were twisted or snapped off at points on their trunks ranging all the way from ground level to their very tip-tops. At one point in the forest, stand five giants close together, their towering trunks still standing some 150 ft. in the air—but they are topless and there isn't a single limb left on a one of them.

Trees of huge girth have been snapped off ten to twenty feet above the ground and carried for considerable distances by the wind before they were allowed to fall.

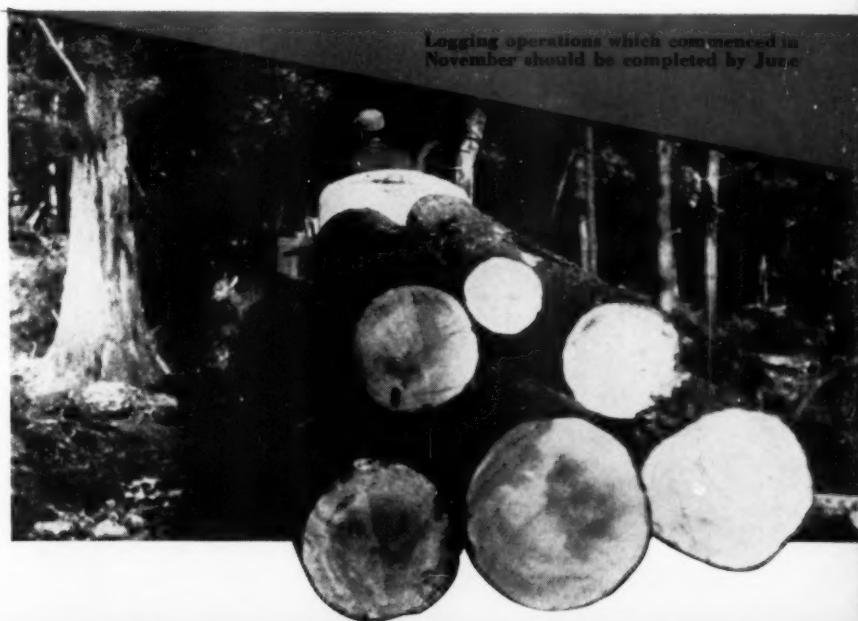
When news of the destruction went out over the press wires large numbers of persons—nature lovers, forest enthusiasts, outdoorsmen, conservationists—were shocked by the suddenness and extent of the damage for they had come to look on the plot of preserved timber as a shrine; a temple wherein all could worship at the altar of "conservation." It was a beautiful thought, but one that now brought about the fermenting of many cross-purpose drives. Foremost among these was a drive to have the Department of Forest and Waters clear the way along Longfellow Trail, a nature trail through the "Cathedral of the Pines," and leave the rest of the wind-fall lay, preserved for posterity. It was the thought of the backers of this movement that if the future generations were not to see the great trees standing in their glory, they could at least see them laying in their defilement.

This, too, was a good thought, but it was the same kind of thinking that had, in an indirect way, brought about the devastation by allowing time and age to prepare this "Kingdom of the Pines" for the ravages wrought on it by the wind-fury of August 18th. A decade ago trained

foresters had determined that in order to preserve the "dedicated" stand of timber it would be necessary to institute a system of selective cutting so that the aged and infirm trees could be removed. Their plans were considered and accepted by the Department of Forest and Waters and a complete sawmill was bought and installed for the purpose on the grounds of the Cook's Forest Park. Immediately a clamor rose from the public, who without a doubt felt that their actions were directed toward the best interests of their "beloved" virgin timber, and it persisted until the department was forced to vacate its planned selective cutting and sell the sawmill. Since then any attempt to do even necessary cutting has met with stiffest resistance.

And due to this resistance Cook's Forest as a whole, and the "Cathedral of the Pines" area in particular, stood well populated with giant trees whose outward appearance of "strength" belied the true weaknesses that existed within their trunks. And with the "no cutting" ban in force the people who favored it were convinced that through their efforts the virginity of the forest would be preserved. All the attempts of the foresters during the decade that intervened to point out the fallacy of such thinking met with callous misunderstanding. And in some cases, they

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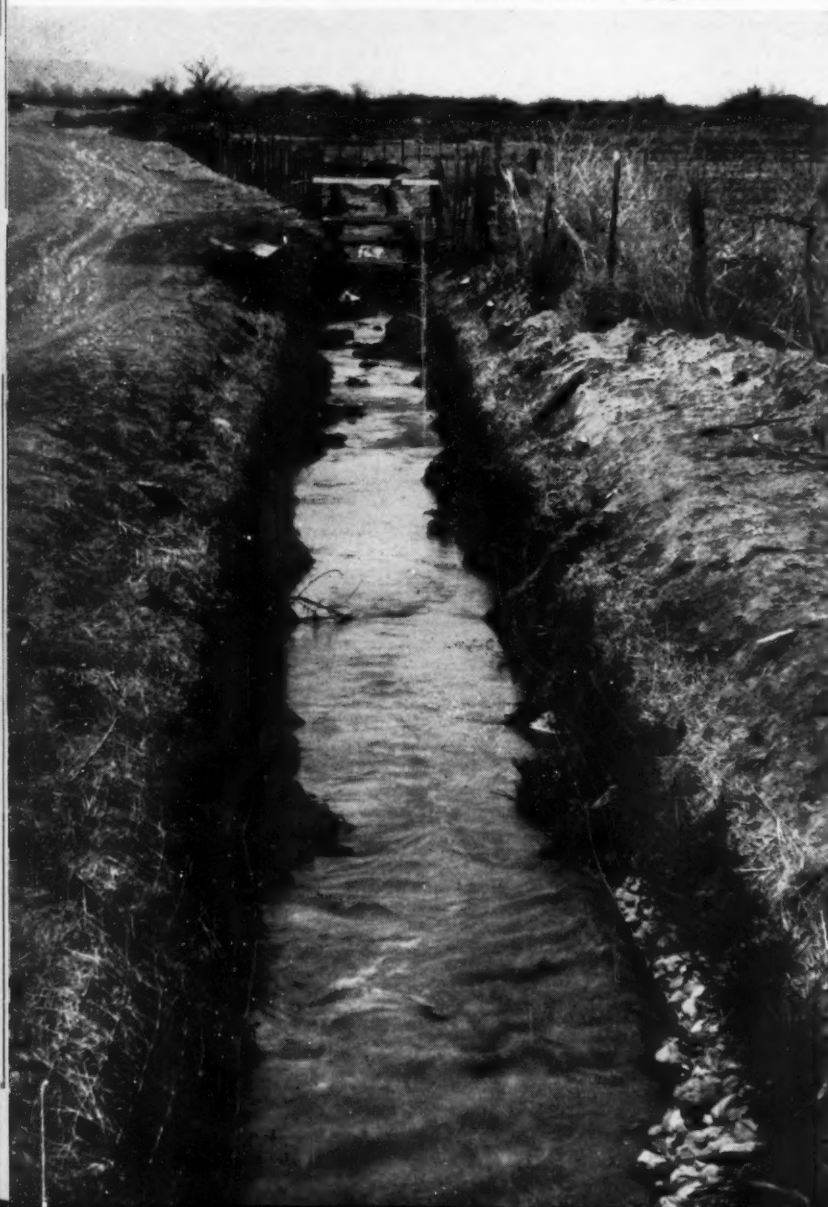


Logging operations which commenced in November should be completed by June

DRAINAGE versus DUCKS

By R. G. LYNCH

Drainage ditches are called "ogres in the woodpile" by sportsmen and conservationists for threatening our duck population



NORTH Dakota, east of the Missouri river, is dotted with clusters of grain bins and scarred by a multiplicity of drainage ditches. The same landmarks are to be seen in South Dakota and Minnesota.

The bins contain millions of bushels of price supported surplus grain. While this surplus was accumulating, the federally subsidized ditches added more than a million acres of new cropland in these three states, and they are continuing to bring more land into production each year.

The bins and the ditches are symbols of an inconsistent policy of the United States Department of Agriculture, which recently was put squarely up to Secretary Benson. There is "cautious optimism" that Benson soon will stop subsidized drainage.

The anomaly of subsidized drainage in a farm aid program that features price supports for overproduction has existed since the mid-1940's. It has cost the nation's taxpayers, needlessly, millions of dollars. It has crowded sound, long-range farming practices into the background in this region. It has substituted soil utilization and water disposal for soil and water conservation, which are stated as important aims of the farm aid program.

Nature has given warnings against this interference with her management of the prairie lands. Last June, Rep. Harold O. Lovre (Rep., S.D.) asked for drought aid from the farm



Conservationists are protesting the paradox of subsidized drainage—it brings more land under cultivation for production of surplus crops and threatens fine duck breeding grounds

Subsidized drainage has destroyed almost 1,000,000 acres of choice duck habitat

home administration for 26 counties in South Dakota, 23 of them in the eastern part where drainage has been running wild for a decade.

In 1955, the North Dakota Water Commission stopped drainage in three north central counties in the belief that it was aggravating high water conditions. Some 15,000 acres flooded in the Mauvais Coulee Area and Devils Lake, into which that area drains, was so high last summer that adjacent highways were under water and had to be closed. Rep. Usher Burdick (Rep., N.D.) put a bill through Congress to reimburse farmers for flood damage, the president vetoed it and the matter now is in the court of claims.

Yet the only concerted outcry against drainage of the pothole country has come from wildlife conservationists. They are alarmed at the destruction of the nation's principal duck breeding grounds. The Dakotas and Minnesota normally have produced three-quarters of all wild ducks hatched in the U.S.—about 9% of nation's ducks.

In little more than a decade, some 300,000 potholes and sloughs have gone down the drains, perhaps 24% of all the breeding habitat in this region. A waterfowl biologist told this reporter:

"A series of good nesting seasons have kept the results from showing up, but the first dry year over all of this pothole country, I think, will reveal that half of the duck production has been lost. We'll be short five million ducks."

Since hunters began to buy duck stamps in 1935, the Interior Department has purchased less than 250,000 acres of waterfowl habitat in the United States with stamp revenues. Since 1943, the Agriculture Department has destroyed nearly 1,000,000 acres of the choicest habitat with subsidized drainage in these three states alone, the nation's last great "duck factory."

As a result, the Fish and Wildlife Service (Interior) and the Soil Conservation Service (Agriculture) have been at loggerheads since 1949, when wildlife men charged that the SCS was promoting drainage harmful to waterfowl. Efforts have been made on both sides to solve their mutual problem.

SCS men contended that drainage of small, temporary wetspots into larger areas benefited ducks by creating permanent large water and marsh areas. Wildlife men conducted a study in the Waubay area of northeastern South Dakota and showed conclusively that communities of small temporary potholes and larger permanent wet spots were essential to wild duck production. The decorous ducks seek privacy for courtship and honeymoon, returning to community life with their broods after the small wet spots dry up.

Nature produced conditions in the spring of 1955 which refuted SCS claims for benefits to ducks from permanent potholes. After several normal seasons, all but 27% of the potholes in the Waubay study area remained dry in 1955. The total

acreage of water was down only 23% because the larger, permanent potholes remained, but the breeding population was reduced by 62%.

SCS suggested that F&WS send men into the wet areas to dissuade farmers from draining. A change also was made in the regulations for 1955 which banned aid for drains when the primary purpose was to bring additional land into production.

Wildlife men not only talked to farmers; they also checked drains and found that both letter and intent of the new regulation were being violated.

Soil Conservation Service men sum up their problem like this:

Drainage is the farmers' major problem. They "don't give a damn about raising ducks." With the big equipment used in wheat growing, they won't go around hills and don't want to go around potholes. They have a short growing season and drainage enables them to get on the land earlier. In some areas, standing water gets salt in solution from the underlying glacial till and spreads it through the soil. Drainage will leech such soil into good condition in about four years.

C. D. Jaedicke, deputy state conservationist for North Dakota, produced figures on all drainage, even before SCS began to operate, which showed 456,125 acres drained in areas of low wildlife values, 204,723 in areas of moderate values and only 50,341 in areas of high values. The
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THE SNOW LIES PATCHED

*The snow lies patched on our enduring hills
Where surfaces first face the morning sun;
Snow water mumbles down slow winter rills
But stops when sunset freezing has begun
And winter birds seek shelter for the night
In fodder shocks and in the frozen grass
And shadows of owls' wings in bright moonlight
Frighten the timid rabbits when they pass.
And then to see an evening silhouette
Of snow-patched crazy quilt against the moon,
Enduring beauty one cannot forget
That cannot come too often or too soon.
On cone-shaped northside slopes the snow lies deep
Where weakened winter suns can't penetrate
And barren oaks wind-creak in frozen sleep
Unmindful night is long when spring is late.*

Jesse Stuart

READING ABOUT CONSERVATION

By JAMES B. CRAIG

VIOLA C. WHITE fans will be glad to hear that her book has been published. *Vermont Diary*, Charles T. Branford Company, Boston 16, Massachusetts, 145 pages, price \$3.50. The volume includes the accounts of her Middlebury rambles first published in *American Forests* in 1953 and 1954 that resulted in a shower of letters from appreciative readers. According to them, Dr. White is an unusually aware observer.

Awareness, of course, is not uncommon. Many people have it. Relatively few, however, have the knack of setting down their impressions with any degree of freshness. And there are scarcely any who can capture the very essence of nature's shifting, capricious moods in one or two sparkling sentences that say it just right.

At this sort of thing, Dr. White excels. While she has a shrewd eye both for people and nature, she has an even shrewder way of describing what she sees or feels with deft, polished strokes and with an economy of words. Some of her sentences gleam like jewels. One remembers them. While she is seldom at a loss for just the right word, she is not above coining one on occasion to obtain the effect she desires. We looked in vain in Mr. Webster's dictionary for the word "strimmery" although its use seemed proper enough in her description of sprouting oak leaves.

According to its dust jacket blurb, *Vermont Diary* was written "in defiance of our mechanized age." Which struck us as a little out of key unless the blurb writer construes a predilection for long walks as an act of defiance in this age of automobiles. At any rate, he must have

missed Dr. White's whimsical and appreciative comments on the "legends of the Rutland Railroad," which was more or less mechanized.

Fortunately, for the readers Dr. White has more important things to do in her book than "defy" the age of mechanization. She does those things extremely well. The diary is full of unexpected delights such as the two-paragraph short story on her discovery of the grave of an Egyptian prince in Middlebury's West Cemetery. How did a prince who died in 1883 B. C. find his way to a New England burying ground? You'll have to read the diary to find out and it's well worth the time.

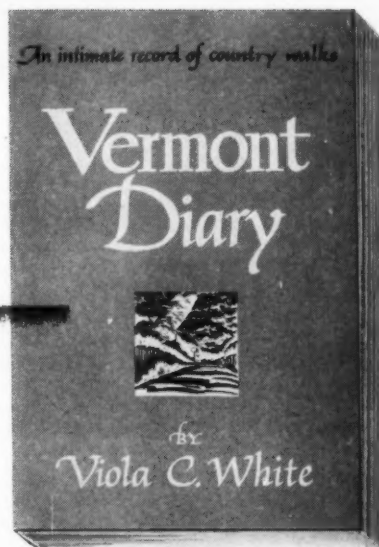
Most of this book, of course, concerns itself with the changing seasons in a New England community. Like Thoreau, Dr. White seems to be saying that there is a Walden pond for everybody if people will simply take the trouble to walk a mile or two to look for it. There are also numerous asides on people and events, both droll and otherwise, that give the book a fine flavor. We marked a few:

On the garrulous nature of New Hampshire people—In New Hampshire the road warnings read "Caution—bad road ahead"—and in Vermont the one word "Bump."

Definition of education—"To render harmless by cultivation."

Etiquette—"Etiquette has reduced dog and American woman to the same status—the door is opened for the dog, the door is opened for the lady. The dog can't do it, and the lady won't."

On a defeated political candidate—"According to the current news Mr. Healy has conceded his defeat for the state senate gracefully. He



claimed that he was going underground adding that most of the present voting public would also be underground before he expected to rise to the political surface again."

Differences between Vermonters and State of Mainers—Vermonters much better informed about their native state and a more solid, impenetrable bloc politically. Maine people more articulate but their humor more drawn out. Vermont humor more like the French—pared down, with a whiplash at the end. But people of both states are kind, hospitable and independent.

But *Vermont Diary* is different. The author cares about words and chooses them carefully. There is no excess baggage and consequently the diary is alive and moves right along with the seasons it describes so vividly. It is never sentimental. In short, it's good. In fact, it's one of the best things of this type that we have ever seen.

(Editor's Note—Viola C. White, former curator of the Abernathy wing of the Middlebury College Library, is an authority on Thoreau. As her book reveals, she has provided much assistance to writers and students engaged in researching various aspects of the famous philosopher's career. Dr. White now makes her home at Chapel Hill, North Carolina. Her first book was "Not Faster Than A Walk." For the benefit of the many *American Forests* readers who expressed interest in her work when first published we are informed that her publisher, The Charles T. Branford Company has recently moved to 69 Union Street, Newton Centre 59, Mass.)

With improved weather-making techniques, the world has become an exceedingly small place in the eyes of the weather scientists. In fact, when it begins to rain, you can't tell who or what started it—for sure

HOW THEY MODIFY

By K. D. CURTIS



WITH drought conditions widespread over the last two years, more new interest has been awakened in the "rain-makers." "Weather modification"—the term scientists prefer—is the treatment of clouds by artificial means so as to cause rain, snow or other moisture to fall. Or—not to fall. Or to cause threatening storm clouds to change themselves and move harmless across the area. Or—for military purposes—to deluge enemy army, air and sea forces that threaten us with downpours set off many, many miles away from the place where our "weather-makers" went to work. Technicians cooperate with forecasters to work on the weather in a big way.

Just how important, in the eyes of the public, is the "weather-maker?"

You'll have to admit to allow "just anyone" to fool around with changing the weather is dangerous. That's what Congress thought, too, and asked President Eisenhower to appoint a committee "to study and evaluate public and private experiments in weather modification." There are some really famous names in that group, trying to figure out the answers. Among the questions is the one regarding possible government supervision of people who alter weather, professionally.

"As it stands today," the famous scientist Dr. Vannevar Bush told a Senate group, "we are on the thresh-

hold of an exceedingly important matter. For man has begun for the first time to affect the weather in which he lives. And no man can tell where such a move will end."

To every alert American youth, the defense of his country is a problem he will have to live with for a long time. So he will be interested in the statement of a famous American meteorologist:

"Most of (any) nation's weather comes from the West. We could withhold moisture from them or drench them in torrential rains by seeding clouds with the proper catalyst. We might even develop some chemical which has a maximum length of life. This could be seeded into the 'jet stream'—a river of air moving at speeds of 200 to 300 miles an hour around the world as high as 50,000 feet above the ground, and 50 to 100 miles wide. Then this chemical would drop moisture either over the ocean or over western Europe, if needed there. And then the clouds would move on dry (over eastern Europe and Asia) causing, of course, drought."

As you probably know, the "cloud treatment" the scientists speak of actually is a "trigger" technique causing the clouds to get busy and start dropping some moisture, or to change their character. Generally, the procedure is to spray certain cloud formations with "dry ice"

(solidified carbon dioxide) pellets. Or send aloft, into updrafts, a stream of silver iodide particles. There are other methods, too.

Apparently, the four largest commercial cloud-seeding organizations in this country generally depend upon the technique which uses an on-the-ground generator pouring chemicals into up-going winds that mix into clouds some miles away. "Spraying" is done—often at greater cost—by airplanes above the clouds. Some technicians say this is a more accurate way to control where the moisture will fall; others disagree.

How do the "rain-makers" work?

First, of course, they must have the right kind of clouds. Either a more or less local grouping of clouds, or a "cloud-sheet" covering many thousands of acres. They must know the temperature and moisture content of the formation. Modern equipment at weather stations makes this possible. This information determines when, where and how much "seeding" material should be used.

Operators of the ground generators must know, too, the current conditions of the atmosphere from the ground to the topmost peak of the cloud formations. This includes speed and direction of wind at all the altitudes, the varying temperatures and moisture distribution throughout the mass, and any special turbulent wind-currents there. Also the weather forecast. Of course airplane "seeders" would find all this data useful, too.

The Irving P. Krick organization of Denver—said to be one of the largest—seeds clouds with a widely-flung system of ground generators. Krick technicians send aloft a "crystals plume" created by the burning of special foundry coke bearing silver iodide dissolved in acetone. Their generator has a fuel hopper, with an electrical feed mechanism, connected to a vaporizing "furnace." The unit is comparatively small—it burns only a pound of chemically-treated coke an hour. Sometimes it

WEATHER

treats clouds fifty miles away from where it "smokes."

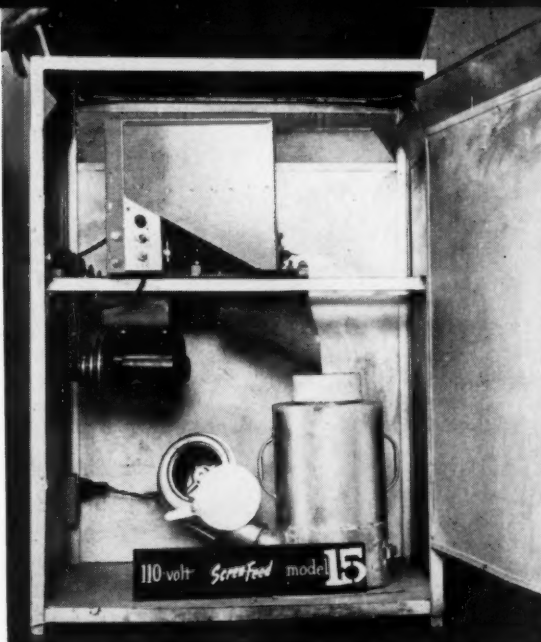
Due to certain conditions, "rain-makers" may become "snow-makers," given the right clouds and a ground temperature below freezing. Then, too, there is "sleet"—clear ice which is frozen or partly frozen rain, and "hail"—a ball made up of layers of clear ice and layers of refrozen snow made in churning winds within a thunderstorm.

What happens inside a treated cloud?

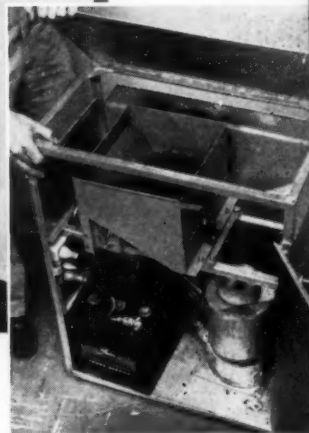
"Broadly speaking, nature precipitates water from the skies in two stages," says Dr. Irving Krick. "The first stage being a droplet or ice crystal formation by a process known as nucleation; and the second, the growth and coalescence of ice crystals or drops thus produced until their weight is sufficient to enable them to fall through the air stream transporting them."

"Nucleation involves the formation of drops or ice crystals upon foreign matter, such as salt particles, dust, or other chemicals, in the atmospheric air streams. These particles act as small nuclei (cores) which attract moisture to form water drops at temperatures above freezing or ice crystals at temperatures below freezing."

"In nature, the temperature at which the formation of ice crystals



Above, generator pours silver-iodide "smoke" into clouds via updrafts from ground. Right, chemically-treated coke fed into furnace to produce "smoke"



... is most commonly completed is approximately—13°F."

It is this fact that nature forms ice crystals within a cloud (the first step in producing a rain drop) at temperatures of about 13° "below" that sets the stage for the artificial "triggering" of rainfall. By seeding into a cloud a special material which acts as a "core" (or "sublimation nucleus," as the experts call it) for an ice crystal at a much "warmer" temperature, rain-making is hastened and increased. The action starts earlier and extends through a greater portion of the cloud. Especially if it is a so-called supercooled cloud.

Strangely, man can wring more moisture from a cloud than would fall through natural processes. And

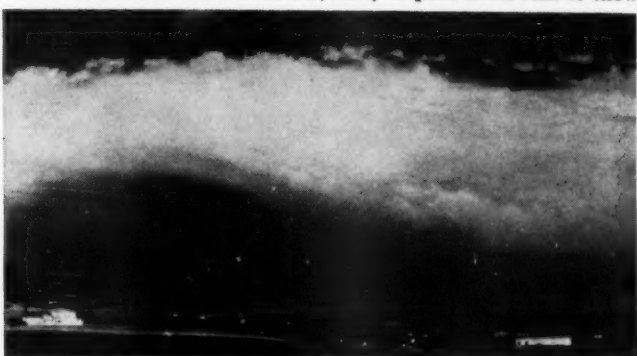
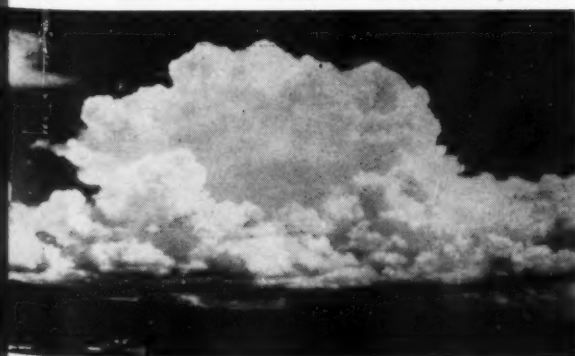
the cold clouds of winter produce more precipitation, in percentage of "yield," than the summer's showers kind. The Krick scientists say they have "harvested" almost ten times the amount of snow (over an agricultural area) from a cloud than would have fallen naturally.

To get a general picture of rain-making, imagine a summer cloud extending from 10 thousand feet skyward to 30 thousand feet. Inside, the temperatures range from 32°F. at its base to 40°F. below zero at the cloud-peak.

Some distance away, word has been flashed to the generator operators to start up the silver iodide-smoke. ("Let's get raining!" they (Turn to page 75)

Usual rain-making procedure is to spray clouds with "dry ice" or send aloft a stream of silver-iodide particles

This woolly cloud, which has been treated by silver-iodide "smoke" has become flattened and fibrous, ready to pour down rain or snow



Over half a million tourists from all parts of the world visit park annually



Monument To A Conservationist

The windswept mountain tops in Acadia Park are favorite spots for tourists



George B. Dorr, first superintendent of the Acadia National Park

Acadia National Park stands as a lasting tribute to the perseverance and energy of George Buckman Dorr; a man who devoted most of his life and part of his fortune to developing this park, and who found a rich life in promoting his pet project

By J. R. CRANE

DOWN Bar Harbor way the old timers still speak of the late George Buckman Dorr as the "father" of the Acadia National Park. Looking at the record it seems that the title is well-deserved. Certainly, the park is a magnificent monument to the man and his work.

Although he was ably assisted by his lifelong friend, Charles Eliot, President Emeritus of Harvard University, and many other prominent summer residents of Bar Harbor's "golden era," George Buckman Dorr was the driving force that snow-balled a gift of a rod square of mountain cliff into a great national park which holds 30,500 acres at the present time. More than a half million people visited this park in 1955 and present figures indicate that the 1956 total will be much larger than that.

The organization that grew into the present national park had its beginning in August of 1901 when George Buckman Dorr, John S. Kennedy, George Vanderbilt, William Jay Sheffelin, Rev. William Lawrence, Rev. William C. Doane, Mr. S. D. Sargent, Rev. William Adams Brown, Geologist Edward S. Dana, Richard Hoe, and George Stebbins, met in Seal Harbor to form the Hancock County Trustees of Public Reservations.

The idea for this organization was conceived by President Eliot's son, Charles, who died in 1897. He was a well-known landscape architect and the founder of the Massachusetts Board of Trustees of Public Reservations. He urged his father to form a similar organization on Mount Desert Island, but he did not live to see it come into being.

When the Maine Legislature convened in 1903, it granted the Hancock County Board of Trustees of Public Reservations a charter to function as a tax free public service organization. Charles Eliot became its first president, George Buckman Dorr its vice-president and executive officer; George Stebbins, treasurer; and Professor Lea M. Luquer, secretary. The law firm of Deasy & Lyman became the corporation's counsel.

Shortly after its incorporation the organization received its first gift, consisting of a rod square section of Mountain Cliff on the Cooksey drive.

This was presented to the organization as a site for a stone table commemorating the sailing of Champlain in 1604, when he explored the Maine Coast for Sier de Monts, who received a commission from Henry IV of France.

The second gift of a picturesque hilltop overlooking Jordan Pond followed, but five years passed before other gifts were made. Then Mrs. Charles D. Homans of Boston, presented the organization with the Bowl and Beehive Tract on Newport Mountain.

Inspired by the gift, Dorr set out to obtain an 85-acre tract of land on top of Green Mountain—later renamed Cadillac Mountain. His old friend, John S. Kennedy, helped with the project and the beautiful spot with its breath-taking view was added to the holdings of the organization.

George Buckman Dorr was born in Boston. His boyhood summers were spent in Bar Harbor at the family estate, Oldfarm, on lower Main Street. He loved the wild beauty of the mountains, and the rugged shore lines of Mount Desert Island. The cool, bubbling springs in the forest fascinated him and he spent many hours exploring the woodlands in search of new ones.

One fine morning when he was following an old Indian trail that wound around Flying Squadron Mountain, he came upon a great natural spring at the foot of the mountain where the trail came close to the southern end of Great Meadow. When he freed it of a covering of sphagnum moss and leaves, the water flowed freely and quickly formed a small pool. Thrilled by the fabulous find, the youth worked happily to shape the sloping ground around the spring into a shell-like concave basin to hold the water.

Dorr attended Harvard College and graduated in 1874. He spent the greater part of his senior year in Europe. Before his tour was ended he visited all of the famous springs on the continent that were famed as places of mystery and worship.

He wound up the tour with a visit to Bosphorus Strait which unites the

Black Sea and the Sea of Marmara. Here there are two famous springs that were discovered by the Greeks in classic times, and which were named by them the Sweet Waters of Europe and the Sweet Waters of Asia.

Many years later, in 1909, George Buckman Dorr resolved to acquire the spring, at the foot of the mountain, that he had discovered as a youth, and present it to the Trustees of the Hancock County Land Reservations. The land around the spring was owned by a Bar Harbor man who offered to sell it for \$5,000. He gave Dorr an option on the land and set a date when it would expire.

Believing that the option was good until midnight of the date set, Dorr went to the spring on the morning of that day with the intention of working there during the forenoon and taking up the option in the afternoon. In the meantime, however, a group of local land speculators had persuaded the owner to agree to sell to them if Dorr did not take up the option by noon of that day.

Fortunately, a friend of Dorr's learned of the plan and acted promptly. Knowing that every moment counted he got a fast horse from a nearby stable and disregarding the warnings of his friends drove the spirited animal at top speed over the rough mountain roads. His mad dash was successful and he got Dorr back to town at two minutes to twelve just as the speculators were counting out the money that would have made the spring their property.

After he had secured title to the place, Dorr built an octagonal, tiled-roof house over the spring. It was constructed of an old Florentine design with the arched openings on the sides covered with glass, so that the public could see the water gushing from the ground. A pipe carried the water outside where it could be used by anyone who wanted to taste the water.

In the fall of 1909 George Buckman Dorr gave the Hancock County Trustees a large tract of land that he had inherited from his father. This included Beaver Dam Pool that is formed where Bear Brook rushes down a ravine between Champlain and Bear mountains.

Years before Dorr had built a bicycle path amongst the ancient trees that surrounded the pool.

Bicycles with rubber tires and adjustable gears were just coming on the market at that time and the path soon became a favorite spot where enthusiastic cyclists tried out their new machines.

Dorr's aged mother was partial to this woodland retreat and he made the path wide enough for her small, one-horse buckboard to pass through the forest trails she loved.

After she died, he decided to give the land to the Hancock County Trustees; but he needed to acquire an adjoining property that included all of Pickett Mountain and some of Champlain Mountain, to complete the gift. His good friend, John S. Kennedy, agreed to help him obtain the property. Consequently, Dorr quickly got in touch with the owners and contracted to buy the land. While its boundaries were

being established, Kennedy left for New York. Shortly thereafter he was stricken with pneumonia and died.

Since there had been no written agreement by Mr. Kennedy to help finance the purchase of the land, Dorr was faced with the prospect of having to pay all of its cost out of his own funds. However, a few days after her husband was buried, Mrs. Kennedy wrote to Dorr and told him that just before he died her husband had asked her to take care of the obligation he had contracted to help pay for the land.

When the Maine Legislature convened in 1913 an incident happened that set forces in motion that eventually turned the land holdings of the Hancock County Trustees into a great national park. It started when a group of real estate men from Bar Harbor introduced a bill in the legislature to annul the charter of the Hancock County Trustees of Public Reservations.

These men contended that the extensive holdings of the trustees were detrimental to the development of the community. They had a well-organized group lobbying for them and were confident that the bill would pass.

When Dorr's attorney called him and told him about the plan, he hurried to Augusta and got into action. He enlisted the aid of his friend, John A. Peters, who was speaker of the house, and started a vigorous campaign against the bill. When it came up for a vote, it was defeated, but Dorr realized that the group might try again at the next session of the legislature. He discussed the matter with President Eliot and they finally decided to try to get the federal government to accept their land holdings as a national park.

A few weeks later, Dorr went to Washington to start a campaign to carry out the plan. He timed his visit to coincide with the coming in of a new administration under President Wilson who took office on March 4th.

Dorr stayed at the home of Gifford Pinchot, at that time a wealthy bachelor who had founded the U. S. Forest Service under President Theodore Roosevelt. Pinchot was a close friend of Roosevelt and eventually persuaded him to work for the plan to establish a park at Bar Harbor.

Dorr spent some time in Washington getting acquainted with the various politicians who might help to put over his project. His social activities included a reception for William Jennings Bryan, who was Secretary of State, and a dinner given by Secretary of the Interior, Franklin K. Lane, in honor of Secretary of the Treasury McAdoo and his bride, the former Eleanor Wilson.

When he was satisfied with the political contacts he had made, Dorr returned to Boston and went on to Bar Harbor to get his attorney, Harry Lyman, to prepare the necessary legal papers for transferring the Public Reservations land to the government if and when they decided to accept it as a park.

In the spring of 1914 Dorr went to Washington carrying maps, deeds, and abstracts of titles to all of the lands owned by the Public Reservations Committee. But he knew that he would need more than a big bundle of papers to put over his project.

There was no Park Service at that time and the Yellowstone National
(Turn to page 62)

Ugly scars of the great fire are still visible in Acadia National Park. However, natural reforestation is recovering much of this ruined area



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Paul B. Sears, he returned to his home at Hawk's Hill where he is now endeavoring to put his newly-acquired knowledge to work. This primer is the outcome. A life member of The American Forestry Association, he took an active part at last year's Annual Meeting at La Plata, Maryland.

Mr. Brett was born in Darien, Connecticut, in 1903, the son of Mr. and Mrs. George P. Brett, the former remembered for his collection of evergreens at Fairfield, Connecticut, a part of which is now the George P. Brett Memorial Pinetum, managed for genetic research by the Yale School of Forestry.

After attending Taft School, Mr. Brett obtained a BA degree at Williams College in 1926. His business activities included service as a security analyst for the Mellon National Bank. Later he served as treasurer and general manager of the Macmillan Publishing Company, and business manager of the New York Public Library. During the war he saw service as a lieutenant colonel in the U. S. Army Air Corps. Mr. Brett married Elizabeth Baldwin in 1927. They have two daughters and five grandchildren.

A WOODLOT PRIMER

By RICHARD M. BRETT

DRAWINGS BY RICHARD ZIEMAN

You and I and 141,000 other people in the Northeast own small woodland properties that total up to something around 11 million acres of commercial forest land. While various public agencies have spent a lot of time and effort in trying to "educate" us on the importance of managing our trees properly, our woodlands are still a long way from being models. In fact, some foresters refer to us as the "problem area in American forestry" which means the forestry communications have not always rung the bell in all cases. Actually, I am convinced that many of us are ready to begin woodland forestry but don't know just where to start. That being the case, perhaps there is some benefit to be derived from our talking to each other. That is where this primer comes in. It is aimed at you. It will try to show you some of the essentials of woodlot management.

There are a lot of reasons, of course, why forestry management is a sound proposition. To begin with, there are many of us who take a high degree of pride in just owning a piece of land. While some foresters might smile, not to be discounted is the fact that forestry can be a lot of fun and a great source of satisfaction to many woodland owners. Of major importance, however, are the economic benefits. Many have found that timber-management is a good long term investment. Tree crops wisely harvested can augment your income and in some cases can provide a substantial part of it.

For the altruistic person, there are also social and economic gains for the whole community in addition to those which help you directly. Areas with well-managed forest lands often attract new wood industries. This sort of development tends to spread out the tax base. This means that highway and school programs advance at less cost to the average landowner. More employment is the result. More young people are encouraged to stay in the community instead of going off to big cities. Another factor that becomes increasingly important is this question of water. In some areas, lack of water is a limiting factor to continued expansion. Good forestry can influence the water holding properties of the soil and in this way forestry can help to control the supply of water.

Wood has certain traditional uses—lumber, paper pulp, wood parts for a host of manufactured articles. An increasing population will make an even greater demand than at present for these things. In addition, as cellulose, wood appears in paper, cloth, and a number of synthetics. Some scientists believe that lignin, a constituent of wood, contains a storehouse of chemical possibilities.

If increasing the national income is your dish, you may know that wood users make up the fifth largest industrial complex in the nation, but your woodlot, in its present condition, is not contributing very much either to your own pocketbook or to that of the nation. For example, reasonable estimates indicate that a woodlot can produce a minimum annual increment of about \$2.00 per acre. Experience has shown that intensive forestry methods can double or triple this annual increment. Further, it has been found that one forest worker is required for every hundred acres of productive forest. If all of you woodlot owners went into intensive forestry tomorrow, many new jobs would be created and much good raw material would be made available.

The primer does not purport to be the last word on any phase of this subject. The primer does intend to illustrate the basic ideas as simply as possible. Before proceeding with the primer, itself, certain assumptions must be made: 1.) that you are a newcomer in this field; 2.) that you now aim to be a confirmed grower of wood products; 3.) that you are willing to spend some time and money on your woodlot; 4.) that, where possible, you are going to do much of the work yourself, maybe with the occasional help of such unsuspecting week-end guests as you can dragoon into assisting.

Mapping and Inventory

Oddly enough, the place to begin this operation is in the air. This is really the only way to see a woodlot in its entirety and all at one time. Since not many woodlot owners operate helicopters, the next best thing is an aerial map. An aerial survey map of your territory can be purchased from the Eastern Laboratory, Performance and Aerial Photography Division, Commodity Stabili-

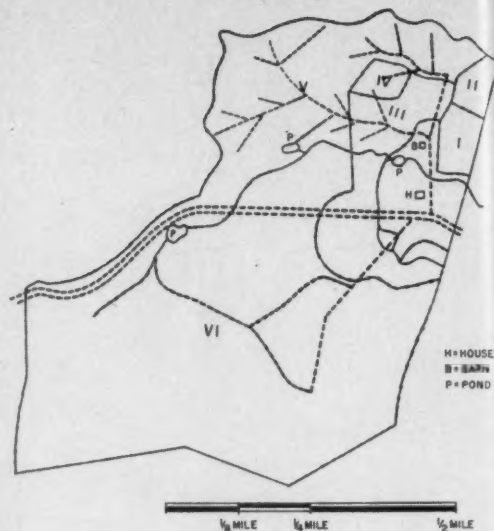


Figure 1

zation Service, U. S. Department of Agriculture, Washington 25, D. C.

The 40" by 40" photographic enlargement is best. It will have a scale in which eight inches on the map are the equivalent of one mile. These enlargements are sufficiently clear in detail to indicate roads, buildings, fences, and water features. An expert can make them divulge much information about the quality of the soil, the nature of the terrain, and the type of vegetation.

Having bought the map, roll it out and locate your property. Since the whole map is too cumbersome for use in the field, make a tracing of your own property. This tracing (Fig. 1) ought to show exterior boundary lines, buildings, and water features. Also sketch in roads and interior fences.

Streams, roads and interior fences are convenient boundaries for working units. Subdivision in some such manner is desirable because differences in soil and plant life in various portions of the woodlot usually call for different treatment. For example, sandy soils favor coniferous trees while loamy soils are better for hardwoods.

A sensible way of making the division is to inspect the ground, sketch map in hand. For example, if you will refer to Figure I, Unit I happens to be an abandoned pasture in need of stocking. Units II and III have already been planted to pine; these two units need weeding to remove trees which might interfere with the pine. You would, then, divide your land into units. These divisions would be based on the kind of silvicultural work which you plan to do in each place. The term working unit is a convenient one which can be used for such divisions. Silviculture means the work done to care for woodlots and forests.

Again, there is no call to be arbitrary; the relative sizes of the various units in the average woodlot are quite unimportant. The whole area is not likely to be very large, so no one piece will be overwhelming in size. Boundaries do not need to be precise, either. Types of vegetation tend to shade off imperceptibly into one another, so it makes good sense to use an old fence line or some other distinctive feature to mark the edge of a working unit.

It is a good idea to maintain a record of the history of each working unit. This record might include: a sketch, the acreage, a brief description, and your silvicultural plans. When you start cutting, the volume and the value of the harvest should be recorded by species. This might complete the record except that it is always interesting to make notes of any unusual conditions of weather, growth, or damage.

It is convenient, but not obligatory, to estimate the number of acres in each working unit. In the future you might have occasion to make a fairly detailed inventory of the number of board feet of lumber or of the number of cords of wood in a given unit. You might wish to make an estimate of annual growth. Since the acre makes a convenient unit for such measurements, it is handy to know the approximate number of acres in each working unit.

There are a number of ways of estimating acreage. One of the easiest is to buy a modified acreage grid. Milton M. Bryan, 3322 Glebe Road, Arlington 7, Virginia, makes one which is simple to use. As you can see from the sample grid in Figure 2, a number of even-size squares are printed on acetate. In each square are four evenly spaced dots. Each overlay displays a list of scales and acreage equivalents.

To use this acetate overlay, place it on the area to be measured. Count all the enclosed dots. Count alternate dots when they fall exactly on a boundary line. Total the counted dots. Multiply the number of dots by the proper acreage equivalent. If, for example, the scale is eight inches to one mile, each dot will equal 0.156 of an acre. Working unit number I, Figure 1, contains about four and one half acres.

Planning and Planting

One of the immediate problems will be how to select the land which you intend to devote to permanent forest. What criteria do you use? Why is working unit I slated for planting; why have units II and III been planted to pine?

The problem can best be approached obliquely by establishing a dogma. So much land is needed to supply the world's population with food that allowing good crop land to return to forest is automatically precluded.

On the other side of the ledger is the fact that trees grow quite well in a wide variety of situations. Granted more than 20 inches of rainfall or its equivalent in snow in any year, some kind of tree will grow almost anywhere. A notable exception to the rule is above the timber line.

Units I, II, and III were used for crop land and pasture prior to 1940. These sites are too steep for either use. The thin top soil was being washed away. So, if you have some steep crop or pasture land, it would be well to protect it from erosion by retiring it to forest.

If the soil is rocky, sandy, or has a heavy clay content, it probably won't even make good pasture. Even if the soil is fairly productive, it might be expensive to try to adapt it to crops. Retire such land to forest, but don't plant just any old tree anywhere.

A tree, like anything else, has to be at home with its environment in order to be successful. An example of the wrong kind of planting is found in the disappointment many people have experienced with red pine in Connecticut. Red pine is a northern tree; planted out of its natural range, this tree suffers from disease and excessive insect damage. Planted in its natural range,

red pine does very well. The red pine planted in Vermont in 1947 as seedlings average 10 feet in height. They all look thrifty.

Trees have preferences besides altitude and climate. While pines do well on a variety of sites, they are quite reliable on deep sand where many other species fail. Red maple will do well in swamps and on muck lands; sugar maple, beech, and ash like well drained loams. Some trees—aspens and pines, for instance—like plenty of light. Others, like red spruce, hemlock, beech, ash, and sugar maple will tolerate quite a lot of shade.

The reason for this is that nature has worked out a sort of sequence for the different tree species. If accident or man creates an opening in the forest, certain pioneers crowd in. These trees are light demanding and frequently are short lived. Their function appears to be to take over the land and prepare it for the next step in the sequence. Some of the pioneers are: red cedar, gray birch, ironwood, hop hornbeam, and of all things in this company of temporary types, white pine. When the pioneers have done their work in creating proper conditions of light and soil, the more permanent forest residents often move in. In the northeast sugar maple, oak, beech,

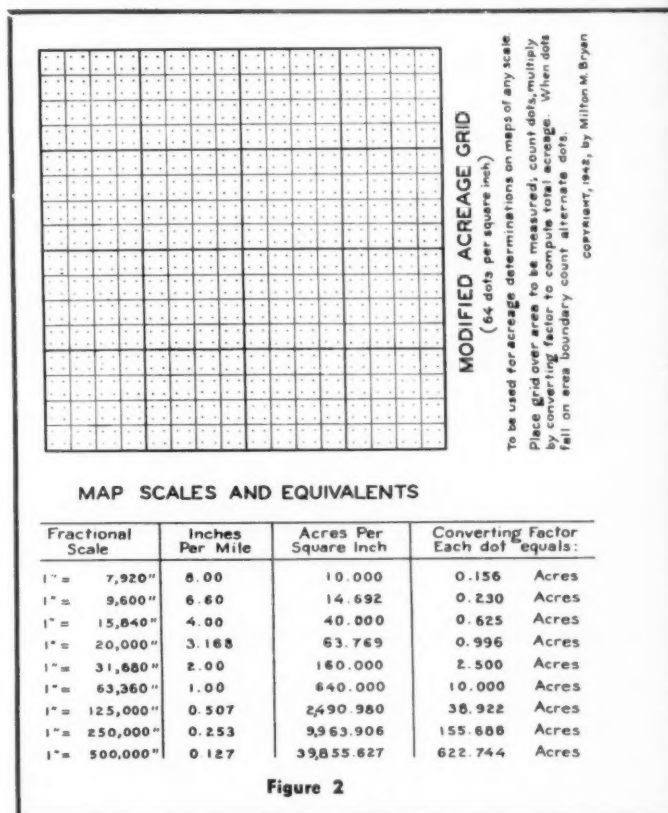


Figure 2

and hemlock are the usual components of the permanent forest. Of course, a generalization of this kind is dangerous. In certain areas of the northeast there may be pure stands of spruce, balsam, or some other species. These exceptions tend to be influenced by local conditions.

For economic reasons man often wishes to interfere with the natural sequence. Since white pine is a valuable tree, man often wants to keep it on the land indefinitely. Normally white pine is not very good at succeeding

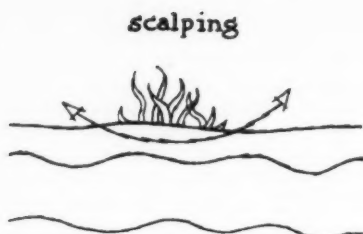


Figure 3

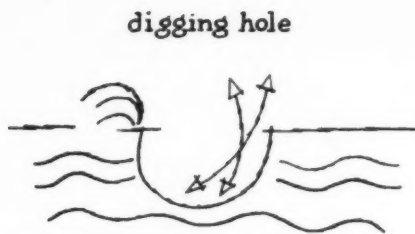


Figure 4

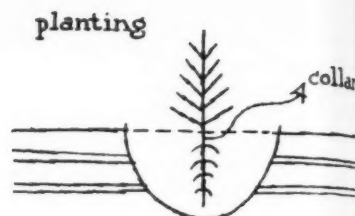


Figure 5

itself, but the job can be done and often is. Like many other things which are done in defiance of the natural plan, this takes planning, time, and effort.

If you insist in keeping white pine on the land, you will have a constant fight on your hands to inhibit the growth of the natural climax vegetation until the pine can become established. Unless the area is open and there is a good supply of pine seed within a few hundred feet, it may be impossible to get a natural seeding of white pine. In this case you must plant the pine. If you elect to thwart the normal sequence—and this is perfectly feasible—you must be prepared to back your choice by weeding out the hardwoods which will invade the pine. There is some evidence that white pine and hemlock are mutually beneficial, so hemlock is no problem.

Since we have touched on the point that some species appear to be helpful to each other or frequently to grow in association with one another, there are some interesting things to keep in mind about forest land.

For instance, a good site for growing trees is almost always marked by a dense growth and a wide variety of plants. A number of people have tried with rather indifferent success to establish a definite relationship between the nature of the site and the vegetation. While the task has been difficult and the results are rather inconclusive, there are certain signs which appear to be valid. Trilliums, spice bush, and the tulip tree often indicate good sites; blue berries, the opposite.

Of course, if the site already has trees on it, it is reasonably easy to make an estimate of its quality. It has been well established that the relation between the height of a tree relative to its age and the quality of the site is a definite one. If trees grow tall for their species and age, it is a sure sign that the site is favorable.

This business of what land to put into forest and what trees to grow thereon is quite important. It might pay to summarize the general theory: if the land is too steep, sandy, or rocky for crops or pasture, plant trees; choose species which grow naturally in the locality; plant these trees in the same soil type in which they grow in nature and use the same combinations of species; where possible obtain seedlings or seed from local sources; work with the natural laws, but if you decide to deviate from them, be aware of the danger, taking the necessary steps to back your decision.

It might be well to go through the steps leading to the decision to plant pine in units I, II, and III.

The land had been used as pasture. In 1940 the farm was abandoned. The pasture had been heavily cropped for several years. While there was little evidence of erosion in spite of the slope, the abandoned farm may give us a clue. The land in the pasture wasn't good enough to support a herd of cows.

In the intervening years units II and III were planted

to pine. Unit I should be planted before the tangle of trailing blackberry vines, milk weed, and golden rod make the task too difficult. In spite of these growths there is a small scattering of white, red, and Scotch pine in the area. The Scotch pines should be removed, since this particular strain of scotch pine is not a good timber tree.

The decision to plant was arrived at as follows: the land was too poor for pasture or crops. From local evidence, however, it is known that such land will support a good growth of pine. Therefore the land should be retired to forest. Red pine is native to the region and seedlings are in good supply from various public agencies. So an order for red pine seedlings was placed with the state forestry department.

How does one arrive at the correct number of seedlings to order?

First, decide the acreage to be planted. Next, decide on the spacing of the seedlings. There is a current theory that white pine should be planted close together; that is, the rows should be either four or five feet apart and the plants in the rows should be four or five feet from each other. It is thought that some protection from the white pine weevil can be obtained by close spacing. We are, however, dealing with red pine which is not troubled by the weevil.

Some foresters believe that an eight foot by eight foot spacing is adequate for red pine. This spacing appears to be a little extreme. Wide spacing tends to produce rapidly tapering tree trunks with heavy side branches. Some crowding tends to reduce the size of the side branches and to produce a trunk with a minimum of taper. Consequently we will compromise and settle for seven foot spacing which involves about 900 trees to the acre.

It must be obvious that if all 900 survived to maturity, the trees would be too crowded. So another reason for close planting is to allow for mortality in the early years. In addition, we want to promote the growth of clear wood, free of knots. Early crowding will kill the lower branches and will promote natural pruning. The aim is to arrive at 150 to 200 well spaced trees per acre as the final crop. Natural mortality and some thinning will produce this result.

There are a few general warnings in tree planting. Rule number one is to keep the roots moist before planting. The second rule is not to crowd the roots in planting. This means digging a big enough hole so that the roots can be spread out. The last rule concerns the depth of planting. If you will look carefully at any seedling, there is a mark or collar which indicates where the earth stood on the stem when the seedling was in the nursery. This collar indicates the proper depth of planting.

When the seedlings arrive, they should be watered

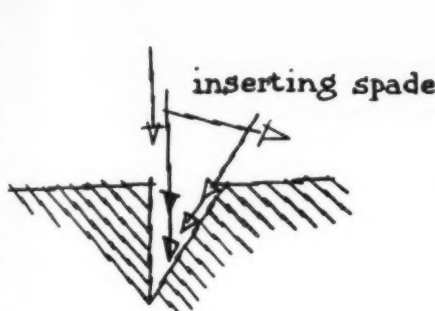


Figure 6

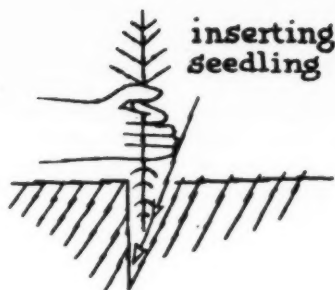


Figure 7

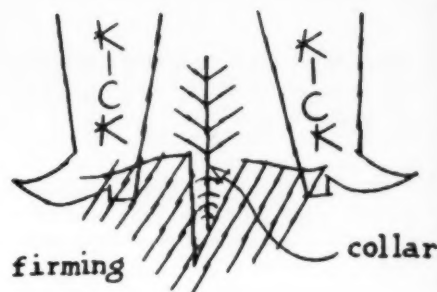


Figure 8

copiously. If you can't plant them at once, dig a little trench in a shady spot; place the bundles of tree seedlings roots down in the trench and cover the roots with moist earth. If you can plant at once, so much the better, but in any event don't forget to keep the roots moist. They can be carried in the field wrapped in damp moss or in a pail half filled with a mixture of water and soil. If the sun is hot or if there is a high wind, cover the seedlings with damp burlap until they are planted.

If the sod is heavy, prepare a scalp about 12" by 18" with a mattock (Fig. 3).

Dig out the soil from the scalped spot (Fig. 4). The root length of the planting stock will be the depth guide.

The planting method is shown in Figure 5. Take the seedling out of its container. Place the roots in the middle of the hole. Spread the roots. Fill the hole with dirt to the root collar of the tree. Firm the dirt.

This is a superior planting method (Fig. 5); survival is high. Planting this way is a slow process. Use this method if the sod is heavy; if the ground is dry; if the planting stock seems to be in poor condition from rough handling in shipment.

There is another method which is rough and ready but is fast. If conditions are right, survival is surprisingly high and a team of two can plant about a thousand seedlings in an eight hour day.

The tool to use is a narrow spade. The planting is done by a team of two. The work can be alternated to reduce fatigue.

Insert the spade in the ground. Push the handle forward. This opens a slit in the soil as shown. (Fig. 6.)

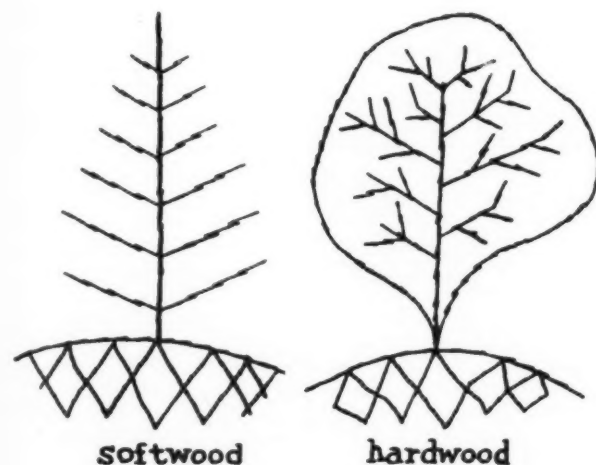


Figure 9

Your partner then slips the roots of the seedling in behind the spade as shown in Figure 7. He spreads the roots as he does so. You slip the spade out of the soil—gently so you do not disturb the roots, and move on to the next site.

With the spade removed, there is enough spring in the soil for it to tend to close. Your partner completes this process by firming the soil around the roots. This excludes air which might dry the roots. The seedling should not be planted any deeper than the depth indicated by its root collar (Fig. 8).

Some General Considerations

Lest the transition from the creative process of planting to the planned destruction techniques of cutting be considered to be too abrupt, this looks like a good place to tuck in some general considerations about forest work; one or two terms often used in forestry; and a word or two about the philosophy of cutting.

Foresters and lumbermen often refer to softwoods and to hardwoods. Oddly enough, the terms are not necessarily related to the relative hardness of the various woods. Instead, the terms refer to two broad classifications of trees. Normally in the northeast, hardwoods have broad leaves which are shed annually. Softwoods are conifers and usually bear persistent needles. In general, also, their shapes are typical. Spruce and pine, for example, are both softwoods and have a straight growth axis from root to tip; maple and beech, both hardwoods, have a spreading branch structure with no single pronounced apex or leader. Figure 9. shows a stylized version of both forms.

For most purposes a general knowledge of the status of the trees in the various working units is sufficient. In most woodlots the only inventory ever made is that of trees actually harvested. Both the seller and the buyer calculate the number of board feet of lumber in harvested trees. The board foot is the unit of measure in selling lumber; it is defined as a piece of wood 12" long by 12" wide by 1" thick.

Sometimes an owner is interested in the number of cords of wood per acre in a particular working unit. Sometimes he may want to estimate the number of board feet per acre. Occasionally he may wish to check on the growth rate. These are interesting refinements, but are too detailed for the scope of this survey. The way to make various kinds of estimates can readily be ascertained from "Managing The Small Forest," edited by Norbert H. Sand and published by the United States Department of Agriculture as Farmers' Bulletin No. 1989.

Now it may not be imperative to know the inventory of trees in your woodlot, but it is vital to know how to

select the trees which will ultimately form the crop. Certainly, all trees are not crop trees. Some species are economically worthless at present; some trees are too small; some are damaged; some have poor form. Just what is a crop tree?

It would be nice to have a simple formula. Unfortunately, there isn't one. The selection of a crop tree is a matter of judgment and experience, but there are a few sign posts.

First, a future crop tree must be a member of a species which is commercially valuable. Second, considering the limitations of site quality and the habit of the species, a good crop tree should be tall, straight, and without noticeable taper in its trunk. For the first twenty feet or so of its trunk there should be a minimum of side branches. The crown—this means leaf quantity and arrangement—should be thick and healthy looking. There should be no visible signs of damage from accident or disease.

The easiest way to acquire an understanding of how these judgments are made is to consult a trained forester with specific knowledge of the locality. You might ask the district or county forester to join you in an inspection of your woods.

The forester will point out the commercially valuable species and the weed species for which there is no present value. The forester will also point out the wolf trees. These are branchy veterans which take up more space above and below ground than they are worth. He will pick future crop trees of the most valuable species and will explain the reasons for his selection. He will point out the defects which may appear in commercial species. Such defects include, among others, poor form; damage from storm, disease, or fire; frost cracks or sun scald.

Overcrowding is a common feature of the northeastern woodlot. The forester will indicate examples of this and will suggest remedies.

Crowding comes from the prodigality of nature. To insure survival nature provides vast supplies of seed. Many of these germinate. If conditions are right in the early and tender stages of growth, hundreds of seedlings per acre survive to form dense stands.

In the long haul, fierce competition for light, water, and soil nutrients will kill off the weaker trees. This struggle for existence goes on over a long period of time and in the end only one hundred or so survive to make the crop. The whole cycle from initial seedling to prime forest might take a couple of hundred years or so if nature does the job.

Man needs timber so badly that he cannot afford to wait for the natural process. In order to satisfy man's importunities foresters have developed cutting methods to cover many different situations. These methods range all the way from clear cutting at one end of the scale to selective cutting at the other. Clear cutting means taking all the trees off the land at one time. Selective cutting means marking certain trees for cutting. Marked trees may be ready for harvest or may be cut to provide growing space for the survivors.

These cutting plans are of especial interest to the large scale timber grower. They have less appeal to the woodlot owner. The large scale operator considers blocks of trees; the woodlot owner studies individual crop trees; in intensive forestry the woodlot owner practices selective cutting.

While there are a number of different systems for cutting trees, the three principal ones are—clear cutting,

shelterwood cutting, and selective cutting. Each has a number of variants.

Generally speaking, clear cutting is of no interest to the woodlot owner. Clear cutting is often applied to dense stands which have been neglected or to areas which have been heavily damaged by accident or disease. Under intensive forestry in the northeast conditions which give rise to the need to clear cut should not occur. Thinning and weeding prevent crowding and promote wind-firm growth. Better forest sanitation reduces the possibility of disease and insect damage.

The woodlot owner may find the shelterwood system an interesting and useful cutting method. This system is based on the knowledge that some species will not reproduce in deep shade, and yet, may in the early stages require some protection from the sun. The shelterwood system has been devised to reduce the shade enough to allow reproduction but to leave some partial shade for the protection of the seedlings in their early life. The method requires plenty of time and patience.

In a series of planned steps the forester tries to create conditions in the forest which will foster natural reproduction of a desired species. We will take a dense stand of white pine as our example.

As indicated in Figure 10 we are dealing with a dense stand of white pine about thirty years old. The stand has not been thinned or pruned. The ground beneath the trees is nearly bare of vegetation on account of the shade and the intense competition for growing space. This is the situation in step one.

In step two certain trees are marked and cut in a thinning operation. The best trees evenly spaced are kept. The cut trees are sold for pulpwood, poles, or some other purpose. Care must be taken not to open the stand too much. To do so might encourage herbaceous growth and hardwoods. At this stage we want only mature pine on the woodlot. In due course the crop trees will grow and will again fill in the overhead canopy completely. It may be necessary to repeat process num-

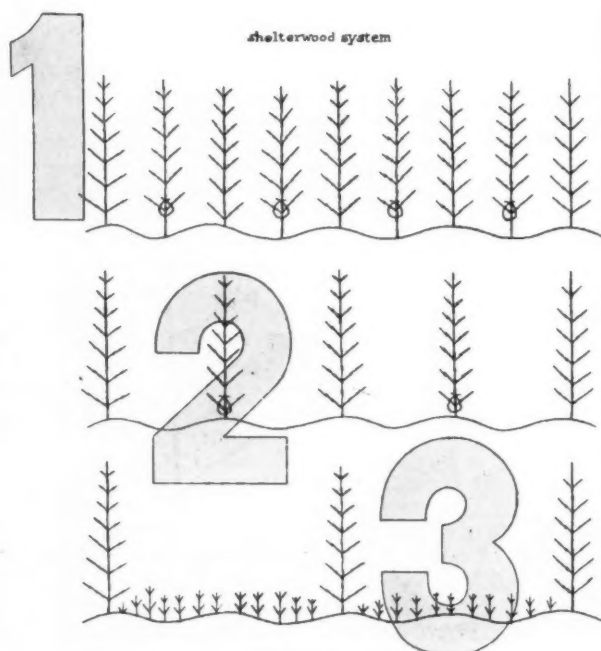


Figure 10

ber two several times until we have cut all but 100 to 200 fine crop trees.

In due course of time—perhaps when the crop trees are about sixty years of age—we may decide to make a harvest cut. We mark and cut all but about fifteen or twenty of the best trees. These survivors must be scattered evenly over the acre. The reason for the even distribution lies in the need for some shade and for enough seed to restock the area. This cut should coincide with a good seed year. Pines have seed crops once every three to seven years.

Step number three shows the land after the harvest cut has been made and after the lapse of several years during which time a large number of pine have seeded in according to plan. The seed trees should be left on the land for several seed cycles to insure complete restocking. Then the seed trees may be harvested. Ade-

seek. If the product is pulpwood, it is more work to cut and handle enough small logs to make a cord of pulpwood than it is to make up a cord of pulpwood from larger logs. Also it must be obvious that it is difficult to make big logs out of small trees.

If there are many small trees per acre in your woodlot, you have two principal alternatives—let nature take its course or take a hand in the situation.

Some Silvicultural Methods

Always supposing that a woodlot is adequately stocked with desirable species, there are three main ways that a forester can influence tree growth. These processes are thinning, weeding, and pruning. It is not necessary to think of these as separate and distinct operations.

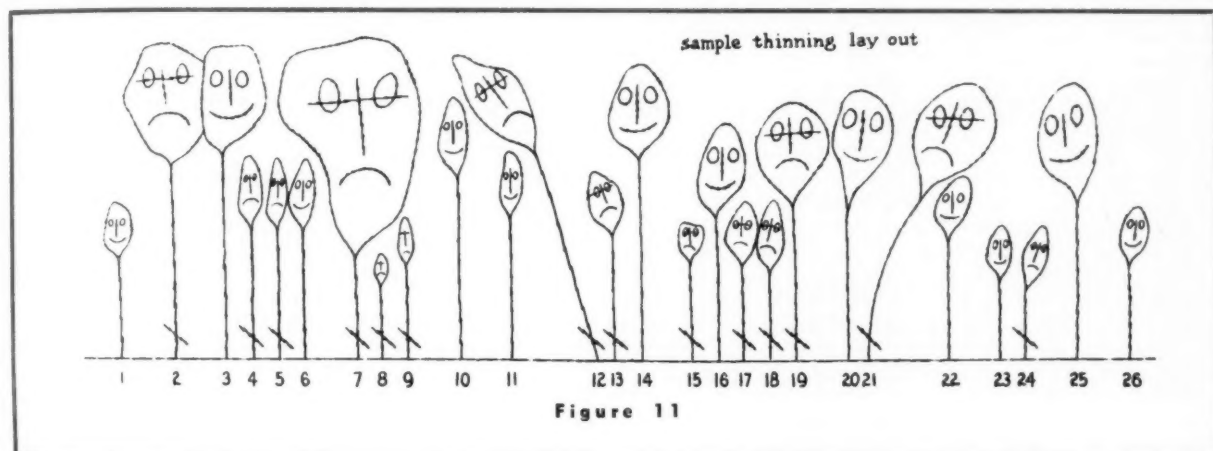


Figure 11

quate care must be taken to avoid unnecessary damage to the young stock.

On the whole pines are intolerant of shade and won't reproduce well under dense shade. The modified shade provided by this method makes it a very good one to use in keeping pines on the land.

The selective cutting system needs little explanation. You favor the growth of the best trees of the best species until they reach their prime. At this point they are harvested.

Anyone interested in the fine points would do well to read Ralph C. Hawley's "The Practice of Silviculture," sixth edition. It is published by John Wiley and Sons Inc.

However, the average woodlot owner needs only to remember a few basic principles:

- 1.) Keep the best specimens of the best species growing as rapidly and as evenly as possible.
- 2.) Keep fire and domestic animals out of the forest.
- 3.) Cut, girdle, or poison weed trees, wolf trees, and poor specimens of even the best species.

There is a reason behind these generalizations. One acre of forest land can produce only a fixed quantity of wood in a given period of time. Consequently, if the land is well occupied by trees, the amount of wood produced is substantially the same whether there are one thousand or two hundred trees on the acre. In other words, the wood produced will be about evenly divided among the producing units.

It follows, then, that it is good sense to have relatively few good producing units. The reasons are not far to

The chances are that you will do a little work in each field as you work in the woodlot.

At first, if the trees in any working unit are small and reasonably well distributed over the land area, there is no great problem. Unless terribly crowded, small trees do not compete much for light, water, and soil nutrients. If the trees were planted on seven foot centers—seven feet apart each way—there will be about 900 seedlings to the acre. Each tree will have plenty of living space for some years. Even if the trees have seeded in naturally and number several thousand to the acre, there probably won't be any difficulty from crowding for several years. Natural seeding sometimes involves a stocking rate of twenty thousand live seedlings per acre at the end of the first year after germination.

As the seedlings grow, quite a different story develops. The small trees start to compete, but in the first few years, a small amount of crowding does no great harm. Weeds are inhibited; there is an ample reserve of seedlings to take care of losses from accident or disease; and the crowded trees tend to prune themselves. However, if the crowding persists, some trees will die; many will lose leaf area. All will grow more and more slowly until a condition of stagnation exists. Under very crowded conditions the net production of wood virtually ceases.

Such a condition certainly does not appeal to the forester. It is not necessary, nor is it advisable, to wait for some trees to die and for some of the survivors to get enough vigor to start growing again. Long before stagnation sets in it is the business of the woodlot owner

to start a cutting operation to lessen competition so that growth is smooth and even.

Figure 11 illustrates a typical northeastern woodlot in need of attention. The trees marked with the diagonal line and characterized by the slightly sad facial expression are to be cut. For example, numbers 4, 5, 17, 18, and 24 are suppressed and crowded by their bigger neighbors. They may not be competing for light, having already lost that battle, but they still compete for water and soil nutrients. The bigger trees would be benefited by their removal. This kind of cutting is termed thinning.

Numbers 2, 8, 9, 13, and 19 are members of a species which is without commercial value. Their removal is called weeding.

During both processes, the forester is on the watch for poorly shaped trees of any species—like numbers 12 and 21. He also has a weather eye out for wolf trees like number 7. In weeding and thinning operations both weed and wolf trees are cut.

A glance at Figure 12 will show you what the woodlot ought to look like after these operations have been carried out.

You may be wondering why numbers 1 and 26 were left behind in the general clean-up. It is known that forests with protected edges do better than those with open edges. If sun and wind can enter a forest through the open sides, the soil dries out more quickly and the climate within the forest changes. It is well to leave a fringe of bushes or low branches on the outer edge of any forest area so that the wind cannot sweep through so easily and so that the sun cannot penetrate to the forest floor. This is the function served by numbers 1 and 26.

While we are on the subject of thinning and weeding, there may be a temptation to do the job all in one fell swoop. Resist it. It is better to do the job in stages. If you thin and weed in several steps, there is less chance of damage from too much sun or wind.

While you are thinning and weeding, you may notice a tree or two badly damaged by accident or disease. Under certain conditions such trees may act as a source of infection for the neighboring sound stock. Such trees should be cut. In extreme cases it might be advisable to burn them to avoid the spread of the trouble.

There are a number of reasons why forest trees are pruned. First and foremost is the desire to produce wood free of knots. After a section of softwood trunk has been pruned, no new branches will be produced in

this section. All the wood which is produced in the future on the pruned section will be clear wood, free of knots. Clear wood commands a premium which justifies the cost of pruning.

Even if this were the only benefit derived from pruning, it would be worthwhile, but there are collateral advantages as well. Silviculture work and logging are both simpler and cheaper in a pruned forest because it is easier to get around in it to use machinery and tools. If the wood is destined for the pulp market, it is much easier to peel logs which have been pruned. Peeled logs command a premium over "rough" logs.

In the northeast pulpwood logs are four feet long; logs intended for standard lumber are sixteen feet long. Therefore, in softwoods, after thinning and weeding, you prune all the remaining trees to a minimum height of nine feet. The extra foot of length is to allow for the stump and the trim. You prune the crop trees intended for lumber to a height of at least seventeen feet. Again, the extra length is to make allowances for stump and trim.

Usually, pruning is not advisable for hardwoods. Hardwoods tend to sprout almost anywhere along the trunk, particularly if live branches have been removed. In dense shade it is sometimes possible to prune hardwoods successfully.

Cutting trees down has been implied in the foregoing description of thinning and weeding. Usually you can get some return for the material cut out in these operations. If a survey indicates that there is no market for the wood which would be obtained in thinning and weeding, there are cheaper ways of eliminating competition.

One such method is girdling. (See Fig. 13.) With an axe cut two parallel rings around the tree trunk. Make the lower ring first; make the second ring four to six inches above the first. These rings can be made at any convenient height above the ground level. If the work has been done carefully, the bark will fall out between the two rings, leaving an exposed area of wood. Most trees, so girdled, will die in one or two seasons.

There are a number of special gadgets designed for this work. Some of them are motorized. If the number of trees to be girdled is small, the axe is the cheapest and most efficient method of girdling. It takes a little time to get the hang of it and it is not easy work in close quarters.

Another method of thinning and weeding is to use poison. You can eliminate saplings and brush by spraying them with 2, 4, 5,—T. By all means follow the

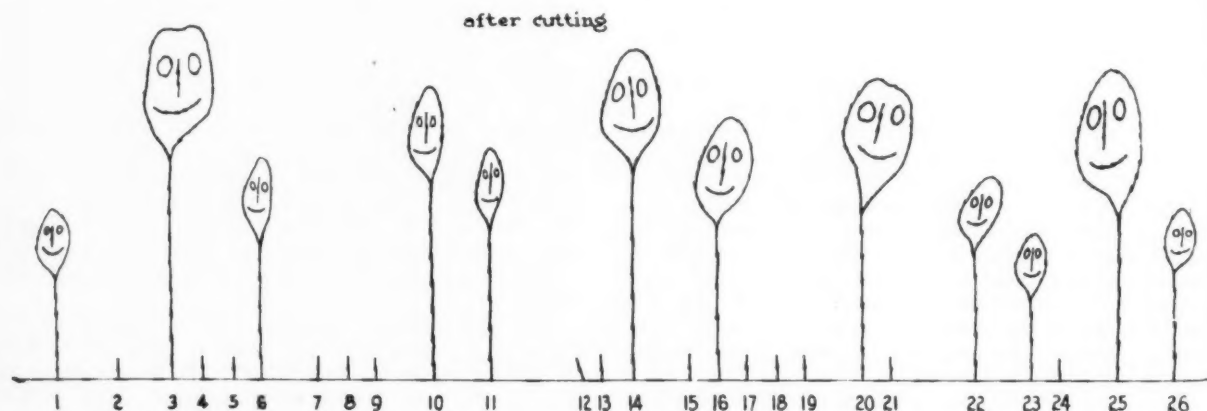


Figure 12

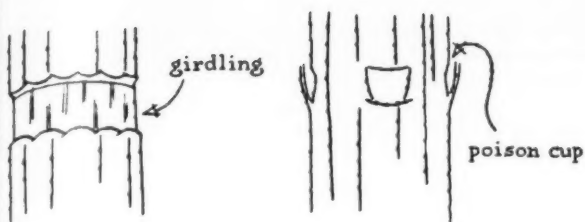


Figure 13

Figure 14

manufacturer's directions carefully. The poison can be used with a hand brush or with a sprayer.

While small trees can be successfully killed merely by spraying their trunks with poison, large trees present a different problem. To kill large trees, make a series of cup shaped axe cuts (See Fig. 14) around the trunk. Following the manufacturer's directions, fill these cups with ammate, 2, 4, 5,—T or 2, 4,—D. Poisoning is cheaper and faster than cutting or girdling. The use of poison appears to have one main disadvantage. If it is used carelessly it may damage valuable growing stock.

Pruning is never done with an axe if the tree is being reserved for crop purposes. Pruning with an axe may damage the bark or leave a ragged wound. Since pruning is a valuable technique, it pays to do the work properly with clippers and saws of various lengths and sizes (Fig. 15).

The object is to make a clean cut close to the trunk without damaging the bark. Obviously, the smaller the branch, the easier it will be to cut. In intensive forestry this means that pruning should be started when the trees are quite small, say when the side branches first start to interfere with each other. At this early age pruning wounds are small and heal easily. The production of clear wood is increased. The work is easy and quick.

As we have seen, all trees remaining after thinning and weeding are pruned to a height of at least nine feet. Between one hundred and fifty and two hundred crop trees may be pruned to the height of seventeen feet. There are some who counsel high pruning, possibly as high as sixty feet, for a few select trees. The great expense of high pruning would appear to make it a doubtful venture.

You may question at this point as to whether pruning injures trees in any way. The answer is that if the work is done correctly, the damage is small.

The reason is that many of the branches will be dead. If the branches to be removed are not actually dead, they may be so shaded that they are not making much of a contribution to the life process of the tree. There is a small amount of evidence that the removal of semi-dormant branches tends to stimulate growth. Do not remove limbs over two inches in diameter. Large wounds of this kind take a long time to heal and so create entrance points for insects and disease. If pruning is done in stages, it does not slow the growth rate. If too many live branches are cut off at any time, however, the growth rate will be reduced.

Figure 16 illustrates the theory. When the side branches begin to interfere, they are removed. The double hatched area indicates how much can be taken off at any one time and still leave enough live branches to keep the growth rate constant.

Pruning to the height of nine feet is best done with the Meylan saw or hand clippers. The Meylan saw is a curved pruning saw mounted on an axe handle. Pruning

above nine feet can be done, using a choice of methods—all arduous and expensive in terms of time and effort.

For white pine there is the "Tarzan" method. You climb the tree to the desired height. With hand saw and clippers you cut the branches as you descend. Another method is to cut the branches with a pole saw. A saw at the end of a sixteen foot pole is hard to control. It also puts quite a strain on the operator's arms, back, and patience. A third method is to use a light ladder. Some aluminum magnesium ladders have been designed just for this work. Be that as it may, totting a ladder on uneven ground in a dense stand of trees is quite a job.

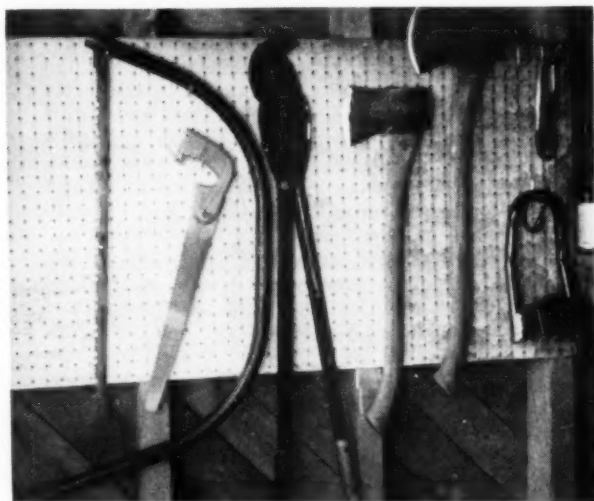


Figure 15

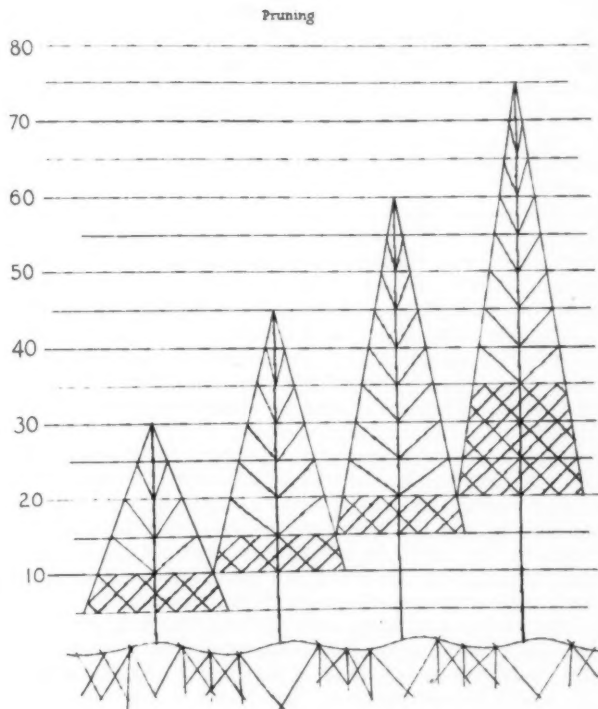


Figure 16

One of the greatest boons ever granted the woods worker is the light weight chain saw. It is at once versatile, efficient, and potentially dangerous, so treat it with respect. Keep the chain sharp and pay strict attention to the manufacturer's instructions on fueling, oiling, and maintenance. The chain saw can be used in felling, limbing, and bucking. Bucking is a term used to describe cutting whole trees into lengths. The best makes are so constructed that they will operate in any position.

One man chain saws—gasoline powered—range in weight from about twenty to about fifty pounds. The import of this is that in using chain saws you must stand

side branches left on is usually free of pressure. Or you can elevate the trunk with a log or a peavy to free the end for cutting.

Operating a chain saw takes care, skill, and experience. All the tricks of the trade cannot be shown in one brief primer. Useful tips can be found in a booklet entitled, "How To Use A Power Chain Saw." This booklet is published by the McCulloch Motors Corporation, Los Angeles 45, California.

The peavy is a sturdy wooden staff, shod with a steel spike and equipped with a steel grab-arm. It is used primarily to multiply muscle power. It is used as a pry; as a support in bucking; and as an aid in rolling logs into position on trucks, skid-ways and so on.

Some may not wish to go to the expense of buying a power saw. For these the hand bow saw is the most efficient one man tool. The Sandvik Saw and Tool Co., of 47 Warren Street, New York, N. Y. has just announced a new type of bow saw blade. The blade is made of very hard steel, cannot be resharpened, and is discarded when dull like a used razor blade. The two man cross cut saw is an efficient tool and provides a fine and companionable way to get warm on a cold winter day.

Marking and Cutting

So far, working in the woodlot has been mostly sedentary. Getting acquainted with the problem and planning are both important, but most people learn by doing, so we might start by selecting a small area of mixed hardwoods to be marked for thinning and weeding.

Don't forget; this is intensive forestry. This means that we are going to give a considerable amount of care and attention to rather a limited area.

To facilitate the work and insure better control of the job the working unit should be broken down to some handy size. Since the acre is the usual land measure, we will divide our working units into acre parcels. By way of information an acre contains 43,560 square feet, and measures about 208.7 feet on a side.

The easiest way to mark trees is to strike the trunk with an old sock filled with lime. Such marks are not permanent. The next easiest way is to mark the tree with an axe; such a mark is called a blaze. The trouble with this method is that you may damage the tree and you cannot correct mistakes very well. In large scale operations foresters use a paint gun with special marking paint. These guns shoot the paint mixture several feet and are very convenient, but the equipment is rather too expensive for small operations. For small scale marking jobs take an old paint brush and any light colored paint. Most people have small quantities of left-over paint around. This is a good way to use up the odds and ends.

Figure 17 illustrates the method. You start marking trees to be cut by painting those at the back of the chosen acre; then you work forward. This route allows you to review your work as you go along because, by looking back, you can see all the trees you have marked. You can correct any tendency to under-mark or to mark too many trees.

Eventually you will want to remove all weed trees, wolf trees, trees with poor form, or those which show signs of some sort of damage. It may be that if all such were to be removed at one time, you would have openings which are too large. This might result in wind

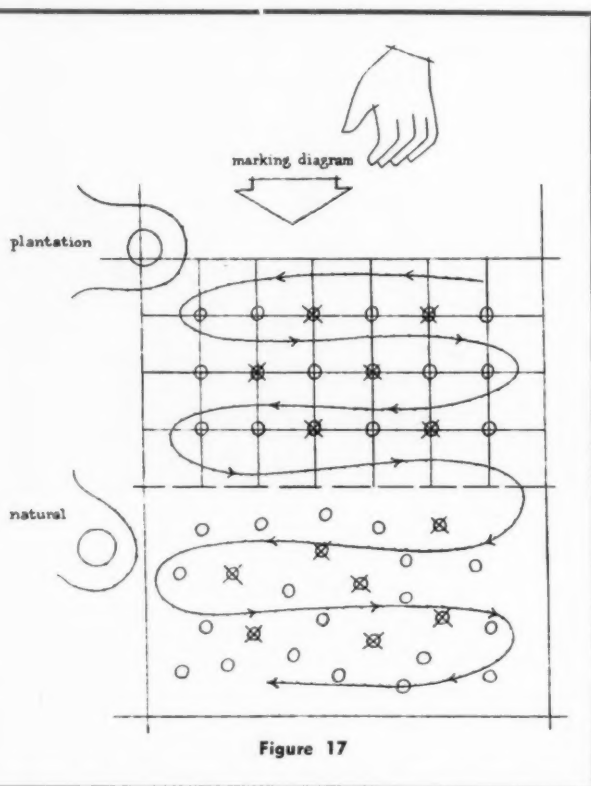


Figure 17

in such a way that the weight will not cause undue fatigue, which, in turn, leads to accidents. You should also notice where you put your feet. Falling into a running chain saw cannot be classed as fun. Some chain saws will bore into a log. Sometimes it is necessary to take advantage of this. Ordinarily it is safer and easier to put the butt plate of the saw firmly against the log before starting a cut.

It pays to make sure that the path of the blade is clear of obstructions such as branches, barbed wire, staples, nails, or stones. Watch out for these; they are hard on the chain. Wire and metals should be removed from the log with an axe before operating the chain saw. Arrange a set of signals with co-workers. It is hard to be heard over the roar of the engine.

One of the main difficulties with any kind of a saw is the tendency to bind under pressure. In felling with the chain saw, the use of wood or soft metal wedges reduces the possibility of binding.

In bucking a log, it should be so placed that the end to be cut is free from pressure. A log with the under

damage and it certainly will result in too much sun on the forest floor. Therefore you may have to do this operation in steps and you can bear this idea in mind as you mark the acre. On the other hand you may mark for cutting some perfectly good trees if the crowding is intense. The important thing is to favor the best trees of the best species.

Figures 18, 19 and 20 show a "before, during, and after" series of photographs of an actual job of thinning and weeding. The situation is typical of northeastern woodlots.

The land on which these trees now grow was pastured until about 1930, so the trees are even aged and quite

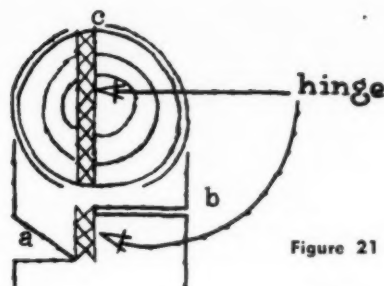


Figure 21

young. They are too crowded; natural mortality has set in; and the growth rate has slowed down. The number of species is not great with sugar maple and hop hornbeam predominating. Figure 18 shows the section before any work has been done.

In Fig. 19 the photograph was taken after the trees were marked with a paint brush and after some of the brush had been removed. Figure 20 was taken after the thinning and weeding had been done.

The trees are still too close together. This was deliberate because the job is to be done in stages to avoid a too sudden change in growing conditions. In this first step, weed trees, damaged trees, and poorly shaped ones were cut. The next step, to be taken several years hence when the canopy has been filled in, will release the crop trees for fast and even growth.

It is time to proceed to the actual cut. If the trees are crowded, the selection of the first tree to cut is important. It should be on the edge of the woodlot or on the edge of a natural opening or trail. The first tree should be felled into the opening to avoid hanging the tree up on some adjacent one and in order to avoid damage to growing stock. The first tree to be cut will enlarge the opening and create space into which you can fell subsequently cut trees.

The steps in the cutting process follow.

With your axe clear away any brush or branches which might interfere with the work while felling the selected tree. Usually it is a good idea to have the working space extend for four or five feet around the trunk. At this point select your get-away route and clear this of brush if necessary.

Then look the tree over carefully for any peculiarities which might influence its fall or in any way be dangerous. Are there any dead branches on this or neighboring trees which might be jarred loose? These are called widow makers. Do large live branches of neighboring trees intervene in the direction in which you hope to make the tree fall? Does the tree have a decided lean in any direction; what is the strength and direction of the wind? Where is the best opening into which to fell the tree, bearing all these factors in mind?

The undercut should squarely face the opening into which you intend to fell the tree. So; start the chain saw and when it is running smoothly, place the butt plate of the saw firmly against the tree trunk and as low on the trunk as possible. Make the undercut. Depending on the size of the tree, the undercut should be from one quarter to one third through the trunk.

Many woodsmen use the chain saw to complete the undercut. Most novices find it hard to make a diagonal cut with a chain saw come out right, so the axe is recommended for chipping out the undercut.

With the axe, chip out a wedge of wood at point "a" in Fig. 21. The next step is to make the backcut at letter



Figure 18



Figure 19



Figure 20

"b". This cut is opposite and several inches above the undercut. In ordinary cutting the back-cut is exactly parallel to the undercut. Pause frequently to make sure that this is so. The aim is to produce an ever narrowing section of wood of even width. This is known as the hinge and is marked with the letter "c" in Figure 21. With the undercut, the hinge controls the direction of fall.

When the hinge is still several inches thick, stop cutting. Check up on the situation. Are there any widow makers? Is your escape route clear? Is everything going according to plan?

If all is in order, proceed with the back-cut. Under normal circumstances the tree will commence to lean a little in the direction of the under-cut as the back-cut progresses. The reason for this is that the weight of the tree is no longer supported on that side. Sometimes the wind or some other factor may cause the tree to lean away from the undercut. This will cause the saw to bind. Pressure can be relieved by inserting a hardwood wedge behind the saw.

When the hinge is quite narrow, say an inch or so, remove the saw from the cut. Drive a felling wedge into the cut directly opposite the side you wish the tree to fall. This is often quite enough to start a tree on its way down. At this point the traditional warning is to shout "timber."

There are many fine points in felling trees. To deal with all the possible variations and complications in a primer of this size is impossible. Helpful suggestions can be found in the "Northeastern Loggers' Handbook."

Because a good chain saw can sever an 18" sugar maple in less than a minute, there is little time for reflection in cutting trees this way. So it is well to keep the following in mind:

1) Plan and clear your escape route; 2) Watch out for falling branches; 3) When the tree starts to fall, stand well back from the trunk; look the situation over; and then go to your selected retreat.

Even after all this talk and effort, some particular tree may misbehave. It may decide to fall where you don't want it or it may decide to catch or lean against another tree and refuse to fall. Cheer up, even the best woodsmen sometimes "hang one up."

If this happens, try rolling the trunk from side to side, using the peavy as a lever. Don't under any circumstances try climbing the slanting trunk to try to bounce the tree down. Don't waste too much time trying to get it down by hand. The best and safest method of dealing with a hung tree is to attach a chain to the butt and drag it down with team or tractor.

Everyone has theories about the best way to deal with the various aspects of limbing. Some say cut a number of trees and deal with the branches all at once. Some advocate finishing one tree at a time.

What to do with the branches which have been cut off is always a problem unless the branches can be scattered without any harm. In most cases, though, there are a lot of branches, some of which may be large. Consequently they may represent a fire hazard of some proportions.

As usual, we find differences of opinion concerning the proper solution. Some states even have laws on the subject. In some regions woodsmen pile and burn the branches as the work of limbing progresses. Unless the work is done when there is snow on the ground, this method involves a fire hazard. Even if there is snow,

fires often damage the foliage of near-by trees. The easiest method is to cut the big branches into smaller pieces and scatter the brush. Then winter snows will press the branches to the ground where they will rot faster.

Now we have arrived at the point that we have some limbed full length trees on the ground. The question is what to do next. They can be cut into lengths on the spot or they can be hauled away as tree lengths for subsequent cutting somewhere else.

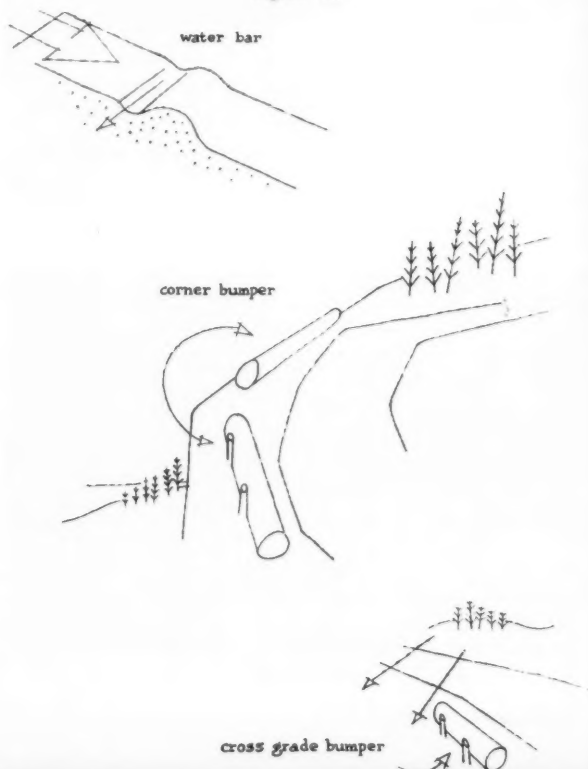
Let's briefly explore the possibilities. If the trees are to be cut on the spot, we have to recognize that measurements tend to be inexact. The reason is that it is often difficult to make accurate measurements in a crowded woodlot. Cutting logs into lengths in the woods is more difficult than doing the same job in the open because the forest floor is often uneven, because working conditions are not of the best, and because saws tend to bind. If the product is pulpwood, cutting on the job means a rehandling of many small pieces.

A better way to do this is to draw tree lengths out of the woods. There is a warning in this connection. Use a skidding pan or scoot to keep the logs off the ground as much as possible. Dirt and stones imbedded in the bark are hard on saws and tend to lower the price received. Whole tree logging after limbing has a number of advantages.

Small twigs and branches are left in the woods to decay and return to the soil, thus helping to maintain soil fertility. Whole trees can readily be sorted by type and species at the central concentration point. A special saw, set up at the concentration point, can cut the tree into proper lengths more accurately and more efficiently than the job can be done in the forest. Accurate measurements make for less waste. The number of pieces to be handled and rehandled is reduced.

On the whole, logging tree lengths appears to be best if reasonable precautions are taken.

Figure 22



Roads

Before talking about specific kinds of roads, there are some general considerations which apply to all roads. Any road should avoid steep slopes, rock ledges, and swamps if it is at all possible to lay them out to by-pass these obstacles.

If it is necessary to ascend a steep grade, the road should proceed across the face of the slope. Turns should be gradual since it is difficult as well as dangerous to negotiate sharp turns with a load of logs.

Water on a woods road soon leads to a mud hole. One of the cardinal rules in this kind of road building is to get water off the road and to keep it away from the road. This is accomplished by building an adequate number of water bars, side ditches, and culverts.

Roads should be planned to avoid valuable growing stock. This may mean a little more road building, but it does lead to better forest production. Figure 22 shows various road structures which will help with the water problem and will help prevent accident while at the same time protecting the forest.

Mention might be made of two more road building musts. No road should be more elaborate than the kind the work requires. A truck road has to have a firm base to carry great weight, but a skid trail needs little preparation. Further, the limiting factor in the success of any road is its most difficult place. This may be a sharp curve, a swampy place, or a steep grade. Every load over the road is limited by the size of the load that can successfully be carried over this bad spot.

Roads have a dual purpose. They take men and machines into the forest for fire fighting, for silvicultural work, and for harvest. They also allow the finished product—logs—to be brought out of the woods.

The first road type is the truck road which connects the public highway with the gathering point. This must be an all weather road with a solid foundation of rock and gravel. It is a permanent fixture and should be well protected against flooding. Ditches and culverts should be large enough to take care of the heaviest rain. The road must be built to withstand the heaviest loads. The United States Department of Agriculture, Forest Service, has developed a booklet on forest roads entitled, "Handbook of Forest Development and Minor Roads." A study of this booklet will solve many technical problems of culvert and bridge building.

The second road type is built for tractor use. These roads lead from the gathering point into the woods. These are permanent trails. Rocks and stumps are removed. Holes are filled. Where grades require it, water bars and bumpers are constructed. Other general considerations of road building apply except that the trails are not surfaced. Do only the minimum amount of construction because these roads are not for truck use. They are intended for teams and tractors only.

The third road type is only a trail. It is not permanent. In fact it is better not to use these trails repeatedly. Its sole purpose is to drag a limited number of trees to the main trail with a minimum amount of damage to growing stock. If your tractor has a winch on it so that logs can be dragged to the main trail without ever leaving it, so much the better.

Road systems can be laid out in a number of patterns. The one you choose will be dictated by the landscape features of your woodlot.

Under certain circumstances the road pattern will be rectangular; in others it will look like the branch



Choice of road system should be dictated by woodlot features

structure of a hardwood tree. Under some circumstances the typical branch pattern of the softwoods might be better. Figure 1 shows one kind of road layout.

Until we have briefly looked into the matter of a power source we cannot really begin the roads or make use of them, so we will consider this for a moment.

Our ancestors used animal power. In fact, in many places and in many seasons, it is still true that a team of oxen or a well trained horse is best for the kind of woods work that is done in the northeast. We, however, are a generation of machine users and the tractor has largely supplanted animal power in the woods.

There is little doubt that the track type tractor is the best kind for working in the woods. It is safe because it has a low center of gravity. It compacts the soil less and has better traction because its tracks spread the weight more evenly. The large track type tractors are expensive—\$4,000.00 and up. There are small track type tractors which sell for around \$2,000.00 complete with scoop and dozer blade. These little fellows are adequate for most small operations.

Returns

So far the primer has been all work and no play. It is time to remedy this deficiency by taking a look at the returns which you might reasonably expect from your woodlot. These are of two kinds—tangible and intangible.

It is taken for granted that you are going to do much of the work yourself. This is the best way to translate your time into money. The reason that this is true is because the prices for logs delivered at the mill are sometimes as high as seven times the prices for the same wood on the stump. This is, of course, an extreme case, but by delivering to the mill it is certain that you can expect two to three times what you might expect to get for stumpage.

Further, in this context, no consideration will be given to the sale of stumpage—wood on the hoof, so to speak. All too many contract loggers are properly known as woods butchers. They frequently pay low prices; cut only the best trees; leave the woods a shambles; and do unnecessary damage to the young stock. If you should find it necessary to sell stumpage, get competent professional advice and assistance in marking the trees, in preparing the contract of sale, and in supervising the cut. The fee which you will pay for this service will be



In some areas of the Northeast, oxen or horses are better than machines for woods work

well worth its cost. The price you receive will be better than you could get and your woodlot will be protected.

Traditional timber crops include fuel wood, pulpwood, fence posts and guard rails, railroad ties, poles, piling, veneer logs, and sawlogs for lumber, just to mention a few.

To find a market for these products it would be a good idea to consult the state and federal agencies. For instance, the state of Vermont maintains an up to date list of wood using plants and factories within the state. The list, entitled "Markets for Vermont Woodland Products," is published by the University of Vermont at Burlington. The University of New Hampshire at Durham issues a state report on prices and standards for wood products; it is entitled "Forest Market Report." There are also a number of private agencies like Connwood Incorporated in Cheshire, Connecticut and the New England Forestry Foundation in Boston, Massachusetts.

The formation of a marketing co-operative offers another possibility. One of the troubles in the northeast is that the individual woodlot is too small to attract the best buyers. To remedy this lack of size it might be profitable for several neighbors to join together in cutting and selling forest products. Such an arrangement could be temporary and informal. An enlargement of this theme would be to form a legal marketing co-operative; that is, one with legal entity. This more formal type of organization would ensure some continuity to the work. If you and your neighbors control several thousand acres, it might pay to look into the possibility of employing your own forester. He would earn his keep in finding better markets at better prices and in advocating measures which would increase the value of the growing stock.

A marketing co-operative should not be confused with its more ambitious cousin, the manufacturing co-operative. Experience has shown that this kind of co-operative has many practical draw-backs. It is sometimes hard to get financing for this type of organization; it is sometimes difficult to control the membership to make sure that they sell to the co-operative mill and not to the outside; on occasion you may have to operate the mill just to pay the overhead. This means cutting

and selling when the prices are not advantageous. It would seem that the marketing co-operative is much more attractive than its more elaborate relative.

However, the real problem in the northeast, at least, is not the availability of markets for high grade products, but how to sell the low grade wood products which are the result of thinning and weeding. For these products there appear to be three main possibilities: pulpwood; fuel wood—retail sale only; and production and sale of wood chips.

If you have an active market for hardwood pulpwood in your vicinity, the problem is largely solved. All you have to do is to conclude some sort of annual working agreement with the local mill. Then thin and weed enough to produce the number of cords of wood for which you have a contract. Unfortunately, at the present time, markets for hardwood pulpwood are either few and far between or spasmodic, so you will probably have to look for another solution.

It is true that the market for fuel wood has been falling off for a number of years. It is also true that many of the new houses have fire places. If your woodlot is within easy trucking distance of a well-to-do residential area, there is a real possibility of creating a ready sale of fire place wood at retail. Buyers of fire place wood have been fooled only too often by low quality and inaccurate volume. As a consequence they are looking for three things in fire place wood: ease of ordering and handling; exact quantities; and high quality. If you can provide high quality wood in precise quantities, attractively packaged, you can command premium prices—in suburban districts, in excess of \$25.00 per cord delivered. A scheme for preparing and selling fire place wood at retail is offered on page 47. The same selling plan might be adapted to the sale of other forest products.

The hitch is that many woodlots are not near a residential area. On the other hand many woodlots, distant from urban areas, are in the heart of a general farming or dairy district. Possibly you will also find nurserymen or poultrymen operating near you.

If you are in an area of general farming, make inquiry into the availability and price of materials used for bedding, litter, and mulches. With a shift in farming methods straw and chaff, formerly used for these pur-

poses, is either expensive or unavailable. In some cases substitute materials are trucked in from a distance.

If bedding, mulch, and litter materials are either scarce or expensive, it would pay to look into wood chipping as a possible venture. It might prove to be profitable and it would certainly provide an acceptable use for thinnings.

Much work has been done to check the suitability of wood chips for bedding, mulches, and litter. Experiments, not entirely conclusive, have been carried out to see if wood chips are good as a land conditioner.

The first step would be to get Bulletin 41, "The Use of Wood Chips in Agriculture." It is published by the Northeastern Wood Utilization Council of New Haven, Connecticut. It will prove to be interesting and instructive and will provide background for the next step. This is to make local inquiry to find out how much bedding, mulch material, and litter the local market could absorb in a year and the price of such material. Then you should study the local labor market to see what the costs of producing wood chips in your area might be expected to be. If you can break even in the business of producing and selling wood chips, it might pay to go into the business because in this way you could get rid of low grade hardwoods without being cash out of pocket. The resultant improvement in the growth rate of your crop trees would be a valuable by-product.

One of the real troubles with woodlot management is lack of imagination. Everyone tends to concentrate his attention on traditional products produced and sold in a traditional way. There appears to be a real possibility that a little attention to the unusual might pay off handsomely. Thinking along these lines the number of secondary woodland products appears to be limited only by the imagination of the woodlot owner. We might explore one or two possibilities, always remembering the basic principles—attractive packaging and advertising increase the chance of sale; retail selling is better than wholesale selling for this kind of intensive forestry; quality always commands a premium price.

Bagged charcoal has a ready sale in small bags for picnic and barbecue cooking. Small portable kilns are available. This might be a good way to use low grade hardwoods, but there are some drawbacks. Producing charcoal requires a lot of hand labor, particularly if the job is done on a small scale. The smoke and fumes from charcoal kilns make them unattractive neighbors.

The production of maple syrup and maple sugar have long been standard woodlot by-products. This activity is somewhat mutually exclusive with the business of

producing timber. Good sugar trees have a large crown and to get full sunlight are often rather widely spaced. This means branches and branches mean knots and knots mean poor quality lumber. Then, too, there is always the possibility that repeated tapping for sap may make a place for the entrance of rot or insects. Nevertheless, maple sugaring should not be discarded as a possibility without adequate investigation.

We will approach the traditional Christmas tree business in an untraditional way. There is little profit or satisfaction in cutting and selling wild trees. These trees are usually scrawny and the prices are low. There is plenty of competition in this field, so let's leave it to the wholesale boys. We want to tailor make trees for a quality market at a premium price.

Since, unfortunately, there is some piracy in this business, select an acre or two of land near the house for a Christmas tree experiment. Prepare the land as if for a garden. You will need nearly five thousand seedlings per acre because you are going to plant them in straight rows three feet apart; the seedlings will be three feet apart in the rows. After the trees are planted, mulch them liberally with wood chips to help hold the moisture, lessen frost damage, and cut down on weed competition.

What species should you plant? In the northeast the traditional Christmas tree is the balsam fir: there is also a market for the spruces. The main objection to the latter is that they do not hold their needles as well as the balsam. As we shall see, this defect is not very important in the kind of Christmas tree business that we are aiming at. Don't be afraid to try some experiments. Some sellers have had good luck with Colorado spruce, Douglas fir, and Scotch pine.

At the end of the third or fourth season there should be quite a number of small, compact trees with good form. If you are near a sizeable town, test a few out as table trees. Buy small wooden tubs; paint them in gay colors. Dig some of the best small trees and transfer them to the pots. In urban and suburban areas such trees may be expected to bring as much as \$5.00 each.

After the fifth or sixth season the trees should be inspected carefully for density of foliage and for perfection of form. If they are poorly shaped or lack density, they should be pruned. Be careful not to damage the leader. You may have to thin out some of the poorest trees at this time unless your sale of table trees has enabled you to remove every other tree, thus creating growing space for those which remain. At the end of the seventh or eighth season you should have fifteen hundred to two thousand prime trees ready for sale. You might try charging \$2.00 for each foot of height if you use the following market plan.

In olden days the whole family used to make an excursion into the woods to select the Christmas tree. The young people had a lot of fun finding and pointing out their selection and maintaining its merits. Somehow the tree a little further on always looks better. Then there followed the great family ceremony of cutting the tree, taking it home, and installing it in its appointed place. This annual rite added something to the meaning of Christmas and was eagerly anticipated.

What we now want to do is to borrow this custom. Let the customers bring their families to the woodlot; let them select and cut their own tree to take home in or on the car. It will be fun for them and, incidentally, the price will not suffer in the process.

If pruning the softwoods can be made to coincide with

FORESTRY TOOLS

Axe—Michigan pattern, single bit, #1 grade 36" hickory handle. Weight—3 to 4½ lbs.	\$ 4.50
Swedish bow saw—30" blade	6.25
Peavy—eastern pattern, 2½" diameter; 5' length	8.15
Pruner—slide shaft, two handed, 34". weight 7¼ lbs.	11.20
Pruner—hand. 8". weight 12 oz.	2.75
Meylen pruning saw—axe handle. 18" blade	10.15
Hand pruning saw—24" blade. weight 1 lb. 2 oz.	5.85
Pole saw—12' to 16' pole; 16" blade	10.50
Falling wedges—6 lbs. (2)	4.08
Splitting wedges—6 lbs. (2)	4.08
Chain saw—gasoline; weight 20 to 35 lbs. 18" to 24" blade; centrifugal clutch	250.00 and up
Total	\$317.51

the Christmas season, you will have a lot of branches suitable for Christmas greens. Some can be packaged and sold by mail; some can be made into sprays and wreaths for sale with the trees.

Now you can see why spruce can compete with the balsam even though the spruce do drop their needles more quickly. These are not being cut weeks in advance. They are being cut for a specific sale or order just a short time before the Christmas use.

If you have a green thumb, you might give consideration to another woodland by-product. Many people enjoy wild plants and flowers. It is seldom that the amateur can transplant these successfully and most of them should not be picked indiscriminately. With skill, the proper equipment used at the proper time, and the right kind of soil, you might be able to turn this liking into account.

If you decide to try the experiment, attempt to duplicate as nearly as possible natural growing conditions. Plant seed or transplant a few specimens by way of test. If you meet with success, you can safely offer your most successful plants for sale. The work is sort of fussy, but in time it is possible to build up a nice small trade in native flora.

Each one of these ventures is suitable for adapting to the retail sales plan offered on the next page for fire place wood.

And finally there is the possibility of fishing rentals. Forest land, almost by definition, is well watered land. You may have a stream or a pond. If you do not have a pond, you may be able to build one without too great cost. You probably ought to have one anyway. Ponds are attractive to wildlife and they provide a convenient water supply for fire protection.

If you decide to build a pond, consult the local state and federal agencies for advice on location, size, depth, and construction details. The same sources can give you advice on fertilizing the pond and on stocking it with fish.

To keep the fish population in balance with the amount of food in your pond, the pond must be fished. The members of your family won't find this chore too burdensome and the fish will be a welcome addition to your table. In addition some of your regular woodlot customers will be glad to pay something for the privilege of fishing on your pond or stream. There is an "if" in this project. You have to maintain the productivity by fertilizing the pond and by making sure that the aquatic life is in balance. Otherwise the fishing is not very good. There are some interesting pamphlets in this field: Blosz, John; "Construction of Farm Ponds," and Meehan, O. L.; "Farm Fish Ponds and Their Manage-

Assurance of continuous supply of wood might bring new plants to Northeast, and thereby multiply benefits to territory



ment." Both are published by the Department of the Interior, Fish and Wildlife Service.

Well, there are some of the kinds of returns you can put in the bank. Are there others, not quite so obvious?

A lot of the land in the northeast never should have been farmed, yet this tipped-up real estate can and does grow good trees. If all the individuals who own woodlots in the northeast decided to go in for intensive silviculture, in a few years there would be a considerable supply of quality wood and a very large supply of low grade wood products for pulp and chemical uses.

In a territory with a large and growing population the demand for wood products is already great and increasing.

If manufacturers could be assured of a continuous supply of wood, new plants might be established in the northeast. This would bring multiple benefits to the territory in the form of more employment, broader tax base, and lower transportation costs. The availability of jobs might reverse the trend of population to the cities which is worrying the sociologists.

But the spiritual returns from a land of well kept forests outweigh the others, important as are the needs for raw materials, water, and a balanced ecology.

As the population increases, man becomes more and more crowded in his daily life. The constant pressure of humanity on all sides tends to reduce the importance of the individual and tends to replace individual values with herd values.

Large areas of well tended forests in various stages of development provide space for solitude. They provide an area in which the individual man can restore his peace of mind and feast his soul. Such forests, having trees of every size, provide a varied habitat for wildlife. Studies of wild animals adapted to and living in harmony with their environment give man valuable clues on his own adaptation to his environment. Last, but not least, the beauty of woodlands in all stages of healthy growth cannot fail to please man's esthetic senses.

Finally in this field of intangibles the individual owner of a well kept woodlot can take great pride and satisfaction from the fact that he is contributing something to these values.

So, if you are interested in any of the following matters, look well to your woodlot, which, with others, can materially affect the issue in:

- I Forestry
 - a) by supplying better trees
 - b) by limiting disease
 - c) by lessening forest fire danger
- II Increasing Income
 - a) by savings from the use of your own wood products
 - b) by adding to annual income from the sale of wood products
 - c) by adding to your woods capital
- III Social Welfare
 - a) by creating a broader tax base
 - b) by creating more jobs
 - c) by making a fuller life possible
- IV Economic Benefits
 - a) by increasing the supply of a renewable resource
 - b) by providing a base for industrial expansion
 - c) by lowering transportation and other costs
- V Conservation
 - a) by increasing the wildlife potential
 - b) by controlling the supply of water
 - c) by limiting erosion

SALES PLAN FOR WOOD CROPS

..... RETAIL

ANY retail sales plan to be successful must be based on a quality product, attractively packaged, at a reasonable price, considering the courtesy and efficiency of the service.

This is an attempt to create a retail sales plan to make a market for fire place wood. The demand is based on the fact that the average fire place in the northeast burns in the neighborhood of three quarters of a cord of wood annually.

The buyer is interested in quality, exact quantity, and simplicity of ordering. The plan follows:

1. Cut logs into pieces exactly 24" long. Pieces 6" in diameter and up are to be split. Air dry the wood under cover to preserve quality.
2. About one quarter of the total cut should be neatly and carefully split for kindling. Make a jig for the purpose of creating uniform and attractive bundles. Each bundle should contain 4 to 6 pieces of kindling, 3 or 4 sticks, and 1 or 2 logs. Bundles with the pieces arranged in the above order should be tied tightly with binders twine or strapped with metal strapping. This

makes a convenient sales unit and the package can be easily handled. Depending on the locality the price per bundle should be \$.75 to \$1.00, delivered. One cord of wood should make about 30 bundles.

3. With a truck-load of bundles make a door to door canvass in a well-to-do residence area. Find out if a permit is required. Offer a sample bundle and a discount of 25% for a season's order. Or offer monthly deliveries — minimum order \$3.00 — no discount.
4. Experiment with mail and telephone solicitation of orders. In the sales talk stress how easy the bundles are to handle; how clean they are compared to loose wood. Stress the fact that each bundle is identical in quantity and quality.
5. Adapt the plan to Christmas trees and greens, maple syrup, and other forest by-products.

Appendix I

SOME INTERESTING AND USEFUL READING FOR SMALL WOODLAND OWNERS

- AMERICAN BOOK COMPANY
Fernald, Merritt Lyndon—Gray's Manual of Botany, Eighth Edition.
- AMERICAN FORESTRY ASSOCIATION
Koraleff, A.—Managing Small Woodlands
- AMERICAN FORESTS MAGAZINE—Monthly
- McGRAW-HILL BOOK COMPANY
Baker, Frederick S.—Principles of Silviculture
American Forestry Series
- Preston, John Frederick—Developing Farm Woodlands
Rural Activities Series
- NORTHEASTERN WOOD UTILIZATION COUNCIL, INC.
Report of Conference at Syracuse, New York. Oct. 9, 1953
Bulletin 41. The Use of Wood Chips in Agriculture
- SIMON AND SCHUSTER, INC.
Glesinger, Egon—The Coming Age of Wood
- UNITED STATES DEPARTMENT OF AGRICULTURE
Sand, Norbert H.—A compilation, Managing The Small Forest.
Farmers' Bulletin No. 1989.
- Simmons, Fred C.—Logging Farm Forest Crops in the Northeast.
Farmers' Bulletin No. 2008.
- Simmons, Fred C.—Northeastern Loggers' Handbook No. 6.
- Tillotson, C. H.—Care and Improvement of The Farm Woods.
Farmers' Bulletin No. 1177.
- UNIVERSITY OF VERMONT
Foulds, Raymond T., Jr.—Markets For Vermont Woodland Products
- JOHN WILEY AND SONS, INC.
Hawley, Ralph C.—The Practice of Silviculture, Sixth Edition.

SOME NORTHEASTERN CROP TREE SPECIES*

Ash, white—*Fraxinus americana* L.
Balsam fir—*Abies balsamea* (L.) Mill.
Basswood—*Tilia americana* L.
Beech—*Fagus grandifolia* Ehrh.
Birch, white—*Betula papyrifera* Marsh
Birch, yellow—*Betula lutea* Michx. f.
Cherry, black—*Prunus serotina* Ehrh.
Hemlock—*Tsuga canadensis* (L.) Carr.
Maple, sugar—*Acer saccharum* Marsh.
Oak, red—*Quercus rubra* L.
Oak, white—*Quercus alba* L.
Oak, black—*Quercus velutina* Lam.
Pine, red—*Pinus resinosa* Ait.
Pine, white—*Pinus strobus* L.
Spruce, red—*Picea rubens* Sarg.
Spruce, white—*Picea glauca* (Moench) Voss.
Tulip poplar—*Liriodendron tulipifera* L.

SOME NORTHEASTERN WEED TREE SPECIES*

Birch, black—*Betula lenta* L.
Birch, gray—*Betula populifolia* Marsh
Beech, blue—*Carpinus caroliniana* Walt.
Dog wood—*Cornus florida* L.
Hop hornbeam—*Ostrya virginiana* (Mill.) K. Koch.
Maple, red—*Acer rubrum* L.
Maple, striped—*Acer pennsylvanicum* L.

*Gray's Manual of Botany—Eighth Edition.

A CONNECTICUT KILN IN IRAN

By HENRY S. KERNAN

Iranian charcoal cutters display their new American axes



Alexis Olson demonstrates method of sharpening cross saw



This primeval forest on the Caspian coast of Iran shown after the charcoal cutters had taken their toll of trees



IF AMERICANS think of charcoal at all, they think of tender meats roasted over warm and friendly embers to a delicious turn. Some may even reflect that those embers are the result of what is perhaps the oldest chemical conversion process known to man. Ages ago, in the dawn of history when our ancestors were stalking the primeval forests of Europe, they were probably having trouble cooking their mastodon steaks over wood. But, as every camper knows, wood is something less than satisfactory. Even the most skillful has struggled with the smoke and ashes, and the sensation that hands and shins are roasting along with dinner. But put that same wood in a hole, and burn it slowly with barely enough oxygen, and you will produce a fuel that is clean, light, smokeless, easy to handle, easy to ignite and easy to transport.

Now if the virtues of charcoal were not lost for ancient man, they most certainly are not for modern man either. The bulk of the world's population still uses charcoal for fuel, and it will probably continue to do so for many years to come.

Fortunately charcoal is not the least exacting as to its raw material.

AMERICAN FORESTS



The Connecticut kiln is rectangular in shape, made of cinder blocks, and capable of coaling wood up to eight inches. A big improvement over pit kilns

The finest piece of mahogany is not one whit better than a chunk of crooked and knotty beech. It seems a natural outlet for the quantities of low-grade wood which choke our hardwood forests.

Happily the Connecticut Agricultural Experiment Station became interested in this problem in the 1920's; and there was developed, under the direction of Messrs. Hickock, Olson and Callward, a new type of charcoal kiln, rectangular in shape, made of cinder blocks, and capable of coaling wood up to eight inches in diameter. Furthermore these kilns could be built of practically any size, would produce a high yield and an excellent grade of charcoal, and were simple to operate. In short, they were a big improvement over the old fashioned pit kilns which had been used in this country and Europe for so many centuries.

Now half-way around the world, in the ancient and romantic land of Iran, charcoal is a burning issue in more senses than one. Estimates of consumption range from 800,000 to 1,000,000 tons a year. Into Tehran alone, everyday, roll 150 swaying groaning trucks of charcoal, each one of which represents the destruction

of two and a half acres of forest. In one day's drive along the coast of the Caspian Sea where the forest grows, you may count hundreds of charcoal kilns.

Here charcoal is definitely frowned upon by the best elements. Restricted, regulated and taxed, denounced in the press, parliament, and best society, it nevertheless manages to thrive. Like sin, it is condemned by all hands, but few manage to escape it entirely.

Most of the charcoal in Iran is made in a kiln that differs considerably from those used elsewhere. It operates on the principle of a retort. The walls, being made of earth and being very thick, store tremendous amounts of heat. Green wood is loaded from the top and is carbonized by the heat stored in the walls. When the coaling is finished, the charcoal is cooled by the introduction of more green wood. The process is a continuous one, so that the kiln is heated and loaded, and charcoal is removed everyday. It will only operate with green wood. Yields of 825 lbs. per cord have been recorded, but the average yield, under good conditions, is about 600 pounds.

There has been a forestry section in the United States Operations Mission in Iran since 1951. Almost from the first, we have been interested in an industry so vital to the country and so desperately in need of some new ideas to shake out its lethargy and inefficiency. Through the welter of palaver, we began, very slowly, to collect information about the problem and to consider how American experience could be applied to its solution.

For example, it would require different and better tools. Iranian charcoal workers do not use an ax heavy enough or sharp enough to cut a large tree, nor do they use saws, wedges or mauls. Consequently, they coal principally small trees, sprouts and limbs. Large trees are stripped of their limbs. If standing, they are girdled to provide more light; if felled, they are left to rot.

Furthermore, it would require a different kiln. The Iranian kiln must use green wood. Consequently in feeding it, the charcoal-burner cuts every last stick he can find near



Woods gang had to learn how to use axes and grind nicks out of the blades

the kiln. Selective cutting over a large area is impossible.

Thirdly, it would need a different organization. At present charcoal-burners live a hand-to-mouth existence financed by petty traders and middlemen. They cannot afford to buy good tools, to build better kilns, or even to accumulate a supply of dry wood.

After months of discussion and research, the Iranian Forest Service and the Forestry Mission decided to set up a charcoal experiment station at the small village of Daland in the
(Turn to page 68)

THE backyard grill, symbol of America's new enjoyment of outdoor living, is creating a terrific demand for an old-time wood product—charcoal.

Americans are spending more time in the outdoors, be it in their backyards, city, state or national parks and forests. It all started when they discovered the thrill of charcoal-broiled steaks, hot-dogs and other foods. The fad seemed to start like spontaneous combustion shortly after World War II. It gives Dad a chance to strut his stuff as the "heap big chef," and offers Mother respite from the kitchen stove.

The demand for charcoal has proved to be good sustenance for two sizeable wood chemical industries in upper Michigan—Kingsford Chemical of Iron Mountain and Cliffs-Dow Chemical Company of Marquette. And, it has revived some of the old-fashioned charcoal making processes, such as were used decades ago in the hardwood timber regions. Correspondingly, the de-

By **WILLIAM J. DUCHAINE**

mand for chemical wood has increased.

Accompanying the mass movement to outdoors living is the manufacture of scores of stationary and portable picnic grills. One of the leading manufacturers is the American Playground Device Company, of Anderson, Indiana, which incidentally, made the headlines back in 1951 when it bought the upper Michigan sawmill town of Nahma.

Production of wood charcoal was under way centuries ago in countries where timber was abundant. In the earlier days before the introduction of coke, large quantities of charcoal were used for the reduction of iron from its ores. So great was the demand for charcoal where iron ores were found that serious inroads were made on the timber in these districts. This was the case, for example, in the county of Sussex in England, where at one time the smelting of

iron was an industry of considerable importance.

Hardwood timber stands in the 13 American Colonies were an important factor in the winning of the War of Independence. By 1775, the Colonies were producing more iron than England and Wales combined. By that time the English forests had been greatly reduced, and the production of iron declined because of the shortage of charcoal. About the same time, British ironworkers were switching from charcoal to coke, but too late to help England stave off defeat in the Revolutionary War.

One of the famous iron producing districts in Colonial times was the Salisbury area in Connecticut. When coke was introduced elsewhere, the Salisbury district continued to rely on charcoal. This is understandable. The fame and quality of Salisbury iron was predicated on sulphur-free charcoal which, together with high ore, was responsible for its excellent resistance to sharp impact.

CHARCOAL

In preparing a new charcoal pit for firing, the collier climbs to top of cordwood pile, already covered with layer of lapwood, to add a layer of wet leaves. There are 35 cords of wood in pit





One of the last charcoal iron furnaces in United States, pictured after it closed down in 1943. It belonged to Delta Chemical and Iron Co., Mich.

When the local woodlands gave out, charcoal was brought by long rail hauls to Salisbury furnaces. Oftentimes, a charcoal train would catch fire. One veteran of that area recalled seeing a blazing train of cars, cut loose from its engine, go plunging down a spur track and on into an open field where it fortunately burned itself out without dire results.

Coke was steadily finding favor as a fuel in proportion as the forests dwindled and charcoal prices arose. And with the end of the Civil War, steel began to come into its own as a metal more adaptable than iron. By 1880, the once flourishing Salisbury district was producing only 9½ percent of the nation's charcoal iron. By 1920, only two furnaces remained in the entire state of Connecticut, though the Salisbury district alone contained as many as 27 in its halcyon days.

The American Iron and Steel Institute's records show that back in 1857 there were 560 blast furnaces in operation, of which more than 400 were charcoal furnaces. Besides the furnaces in operation, there were 270 others not running during that year—older furnaces that had been abandoned or were in disrepair. Most of the idle plants likely were charcoal stacks.

Before and after the Civil War, charcoal kilns and iron furnaces were springing up in the hardwood timber areas of the Middle West. A sizeable charcoal industry developed in Michigan after the discovery of iron ore on the Marquette range at Negaunee in 1844.

While crude forges were built as early as 1847 to smelt ore on the Marquette range, the first blast furnace in the Upper Peninsula was the Pioneer, built in 1858 by Stephen R.

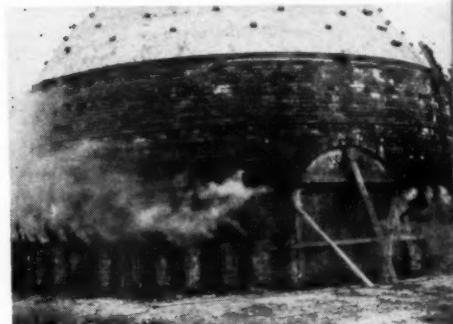
Gay for the Iron Cliffs Company at Negaunee. Later, the Jackson Iron Company built a furnace at Fayette, at the scenic harbor on Lake Michigan.

The Cleveland Cliffs Iron Company built a furnace at Kipling, near Gladstone, in 1898, and a second plant in Marquette in 1903. Cleveland Cliffs in 1905 acquired the Jackson Iron Company's properties, including the abandoned Fayette furnace. The CCI Company had previously acquired the Pioneer furnace at Negaunee in 1891 when the company was organized with a merger of the Cleveland Iron Mining Company and the Iron Cliffs Company.

Charcoal iron furnaces and complementing hardwood distillation plants, producing charcoal, acetic acid, methanol and wood alcohol, were placed in operation in northern Michigan and Wisconsin at the turn of the century.

The "charcoal king" of the region was the late Charles H. Schaffer of Marquette, who died in December, 1945, at the age of 99. Schaffer went to Old Munising in 1870 to complete his brother's contract for loading pig

iron and hauling charcoal to the Munising furnace. About 1873, he built 40 charcoal kilns at a point 25 miles west of Munising. From these, he supplied charcoal for the Deer Lake furnace near Ishpeming and the Pioneer furnace at Negaunee. About 1886, Schaffer purchased and rebuilt the Excelsior furnace at Ishpeming. He built kilns along the Chicago and North Western Railroad in the Escanaba area. About 1889, he purchased and rebuilt the Carp furnace at Marquette, and took in as a partner, Noah W. Gray, who



New kiln of Van Ert Forest Products, Adams, Wisconsin



Cliffs-Dow Chemical Company plant at Marquette, Michigan

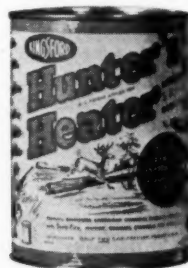
came from the furnace at Ashland, Wisconsin.

About 1904, Schaffer and Gray built a furnace at Boyne City, and a few years later built another furnace at East Jordan, parts of it came from the old Valley Forge furnace that operated in the Revolutionary War days.

Schaffer's last furnace was an all new plant in 1912, the Stephenson Charcoal Iron Company unit at Wells, near Escanaba. This company was named for the United States Senator from Wisconsin, Isaac Stephenson, who was one of the partners
(Turn to page 66)



These attractively packaged charcoal products appeal to chefs, sportsmen



Forester's Notebook

• By KENNETH B. POMEROY

THE greatest scramble for seeds and seedlings ever seen will occur in 1957 as the Soil Bank program moves into high gear. Available seed supplies will be exhausted as soon as the ground thaws when nurseries sow for double the regular seedling requirements. Consequently, cones will be in great demand this fall and, if there are good crops, pickers will earn up to \$25 per day during the four or five week collection period.

This surge in reforestation plus strong indications that clear-cutting and planting will be practiced on many intensively managed forests in the South suggest some excellent opportunities for enterprising people. A supplier of certified seed would find a ready, premium market. For example, although ordinary slash pine seed normally sells at \$2.50 per pound, a Texas landowner offered \$25 per pound for seed collected from trees of exceptional growth rate and good form. At the same time, a South African firm tried to place a standing order for 100 pounds of superior seed each year. Special cone producing forests are the logical answer to the continuing need for quality seed. Already research foresters have shown that cone crops can be tripled by use of commercial fertilizers, and losses to cone-boring insects can be reduced with chemical sprays.

Other opportunities may be in ground preparation and planting on a custom basis as many woodland owners have neither the time nor inclination to plant thousands of seedlings by hand. Several consulting foresters already offer this service at rates which vary from \$10 to \$20 per acre depending upon the number of seedlings to be planted, condition of the planting site, and amount of help furnished by the landowner. Last year 915,428 acres were planted in the United States.

A giant California redwood, 368 feet tall, has been found and measured by Forest Engineers of Humboldt State College. This exceeds by 21 feet the actual height of the famous Founder's Tree near Dyerville,

California, which previously had been estimated as 364 feet tall.

Signs of the air age. Over \$1 million will be spent for aerial surveys, airplane purchases and aircraft rental this fiscal year by the Department of the Interior.

Timber volumes on large tracts can be estimated from aerial pictures to an accuracy of about 5 percent, according to Earl J. Rogers, photogrammetry expert, U. S. Forest Service. Richard C. Wilson, also of the Forest Service, is helping the Bureau of Land Management survey the timber resources of interior Alaska from the air.

Nature's method of flight stabilization for crane flies and other two-winged insects is the basis of a new type gyroscope by Westinghouse for aircraft and missiles. Crane flies have tiny weights on rapidly vibrating arms behind the wings which enable the insect to correct for roll, yaw and pitch in flight.

Substantial progress toward better utilization is being made in Oregon and Washington according to Forest Survey Report 126 of the Pacific Northwest Forest and Range Experiment Station. Between 1944 and 1952 waste in logging residue such as unused top logs, broken chunks and long bolts was reduced from 20 percent to only 7 percent of the sawtimber volume.

Elsewhere, low income from small woodlands presents a major obstacle to better forestry. In a recently published "Analysis of Mine-Timber Marketing in West Virginia," Henry H. Webster of the Northeastern Forest Experiment Station said: "Average gross income from sale of forest products on all West Virginia farms was \$27.69 in 1949. This is less than 3 percent of the average total farm income even though forests occupy 40 percent of the total area of West Virginia farms, and farm forests comprise one-third of

the ten million acres of commercial forest land in the state." One-product markets, a plentiful supply of mine props, and limited competition for other timber uses appear to be the contributing factors. This survey indicates the need for decidedly more research in utilization and marketing of forest products in the Northeastern region.

The major problems of timber management related to small holdings in East Texas are identified by John H. Southern, Agricultural Research Service, U. S. D. A., as: 1) economic and financial difficulties; 2) lack of interest and advanced age of owners. Only 1 small owner in 6 had the major interest of growing timber. Nearly one-half of the small owners have no timber of merchantable value at the present time.

An extensive, unexplained dying of scarlet oak has been reported in West Virginia, with lesser losses in Pennsylvania, New Jersey and New York. Symptoms are a sudden browning and dying of leaves in the top of the tree, usually during late July. The bottom two-thirds of the crown dies in succeeding years. The leaves remain attached for some time in contrast to the premature leaf fall which characterizes oak wilt. Kenneth H. Garren of the West Virginia Department of Agriculture said a survey in Pocahontas County, W. Va., indicated an average loss of 50 mature scarlet oaks per acre; however, the commercial value of this species is very low.

A virus which commonly causes mosaic disease of elm trees is transmitted through pollen, according to K. L. Callahan, University of Wisconsin. Healthy trees can produce diseased seedlings if they are pollinated by pollen from diseased trees. Callahan and J. D. Moore also reported that elm mosaic virus can infect 17 species and varieties of stone fruits such as cherries, peaches and plums, and may become more important to fruit trees than at present.

Our woodlands are reaping the harvest of this high-climbing denizen of the Oregon Cascades. Foresters have found it more advantageous to take conifer seeds from Gowack's winter cache, than to risk the danger and expense of gathering cones from trees



by JOHN B. WOODS

GOWACK — the Cone Picker

FROM the highway at Santiam Pass the forest primeval stretches southward, broken only by the shapely cinder-pile called Mount Washington, ten miles away. The tall trees are of many kinds: Douglasfir, grand fir, western hemlock, Pacific silver fir, white and lodgepole pine, and an occasional ponderosa pine, seeded in adventitiously from the pure pine stands farther east. In the foreground, beside the road, is a group of noble firs, loveliest tree in the woods, their upright needles etched against the sky.

Spring comes late at this elevation, even at mid-April these high ridges of the Oregon Cascades are buried in snow to depths of ten to fifteen feet, solidly packed by recurring Chinooks and following snowstorms. The aspect is forbidding, there are no tracks upon the white surfaces, no birds are in the air. It almost seems that life does not exist in this wintry wilderness, that all the furred and feathered creatures which summer here have gone down to the green valleys.

Yet for the person willing to strap on snowshoes and look about quietly

there is life to be observed. *Sciurus douglasii cascadenis* is present here, and he is very much alive. *Sciurus* is a small rodent with several common names: called by the settlers Yellow-bellied Chickaree, by wildlife experts Cascades squirrel, by loggers pine squirrel and by the Indians Gowack. He is the most numerous denizen of these woods, and in the opinion of foresters who know him well is the most useful small animal extant.

These squirrels live in tree-tops, either in cavities caused by decay or in nests they build out of twigs, leaves and moss. In winter they are quiet and sleep a lot (although not exactly given to hibernation); yet if the would-be observer will stand motionless among the trees for several minutes, he almost certainly will see these squirrels scamper up and down the boles, and like as not disappear suddenly and mysteriously under the snow. The meaning of such disappearances is simply that the rodents have gone down to dinner, for underneath the snow, in tunnels hollowed out by themselves there are stores of conifer seeds, per-

fectly preserved in ripened cones.

Beginning with the first snow-fall the squirrels have made long tunnels over the ground and thereafter have kept them open, connecting their nest trees with underground food caches. Thus the diners are able to exercise choice in the manner of their eating, consuming their provender in the safety of dark caves or boldly carrying whole cones to some vantage point, such as a tree limb near the home nest, and there neatly clipping off each scale or bract in turn to disclose the seed beneath. It is not uncommon in spring to find small piles of cone scales at the foot of many nest trees.

Little Gowack is a handsome fellow, even in winter, when his colors are faded, like Nature's own. In summer he is downright gaudy; the back brownish gray, a black stripe on either side and black ear-tips giving him an elfish look as well. The yellow fur of the belly is continued on legs and feet, while his bushy tail is edged with white. When fully grown, he is a bit more than twelve inches long, over all, and five inches of this is tail. In slightly varying



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form this squirrel is common throughout the forests of Oregon, except in those areas which harbor small boys with twenty-two calibre rifles. The habits of members of these sub-races are similar, yet the Cascade race which lives in the high country with its severe winters probably is the most interesting.

In the life history of this animal we find the female producing four or five young in late May or early June and suckling them for several weeks. Life moves at a rapid pace in this region of short summers, and by late July members of the new brood are leaving the nest daily to forage for themselves. Yet instinctively they remain a family group until something can be done about providing for winter. Throughout the warm summer weeks they inspect all the trees near the home nest, looking for crops of cones and taking possession of those that appear promising, at least to the extent of fighting off members of families from other nest trees.

With so many species of conifers present in the forest, it is almost certain that there will be seeds of several kinds to be gathered for winter food each year. Early in summer, however, there is a problem of finding something to eat *now*. The squirrels cruise the woodlands in search of berries that have hung on the bushes through the long winter, and they pounce upon such delicacies as mushrooms the moment they show themselves above the forest floor. Frequently the rodents are reduced to gnawing the inner bark of trees to supplement their diet.

Actually, little Gowack's chief and abiding interest is in conifer seeds. He watches from day to day the development of cones in all the trees in his vicinity, and one day in late August he skips to the top of the Douglasfir in which his nest is located and with his sharp incisors snips off a few cones, letting them fall to earth a hundred feet below. Quickly he follows them down, gathers them into a small pile close by the base of the tree, and methodically tests each cone for ripeness by biting off each bract and then eating the seed beneath. Such testing is repeated at intervals of a few days in many trees from late August until mid-October with no indication that Gowack intends to store cones for winter use. Even when green and "milky" the seeds of most of the species present have some nutritive value and taste good, and his happy chatter as he tests makes a cheerful noise in the forest.

Testing is not restricted to Douglasfir—Abies or true firs are well liked by squirrels. Also there is hemlock, which has a very small cone and almost microscopic seed, which strangely enough is highly esteemed by them. Two years are required to mature the seeds of all the pines, so crops of pine are less frequent than of other species. Small or large, plentiful or scarce, little Gowack is interested in all the conifers that grow here.

With the Douglasfir, hemlock and the pines, cones are produced at or near twig ends all over the tree. Such branchlets make precarious footing for busy squirrels, yet they rarely fall; and if one does tumble seventy or eighty feet to the earth, he always lands right-side-up and running. True firs bear their cones in the very tops of trees, so the harvesters have a long climb before they can begin work. Fewer cones are produced by each tree, but these are big and plump, ranging from the grand fir's three inch length to six or seven inches for silver and noble firs, and the seeds contained therein are large and meaty.

Like other timber regions of western Oregon this area is under constant patrol against fire from the time the snow melts in early summer until the fall rains come. Except for lightning storms, which start many fires, people are the greatest risk in such a scenic locality, and protection is largely a matter of watching the people who travel the highways and trails and reminding them to be careful with cigarettes and camp-fires. Travelers pass through en route to central Oregon, fishermen and outdoors lovers come to spend hours or days doing what they like best. Altogether, visitors and protection personnel add up to a formidable human population.

This has its effect upon the squirrels, for they resent the constant coming and going of visitors through their home groves. Particularly they object to the visits of curious people just when the serious business of cone testing is in progress. They show their resentment by high-pitched, raucous scolding that sounds half-way between a bark and a snarl. Actually about all the human visitors are likely to do at this time of year is to pick up a few green cones for souvenirs and gaze perplexedly at small heaps of neatly clipped cone bracts left by testing rodents. This is a large territory and it is chiefly along the highways that people intrude upon Gowack, over much of



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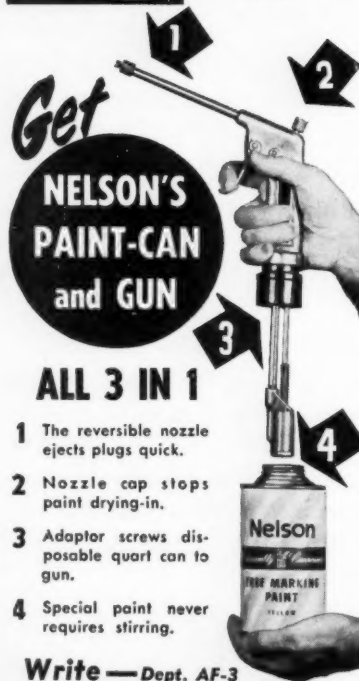


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his domain nobody bothers him during the summer and he is quite free to carry on with being a squirrel.

Each day the rodents go up in the trees, and frequently as autumn approaches they cut cones in considerable numbers to eat. On the ground they visit the many places where cones have been stored in past seasons. They drag out whatever debris may be left from winter feeding, and make room for new deposits. Still the moment has not arrived for the big effort. They are eating cones almost to the exclusion of other food, but they are not yet caching for the winter ahead.

At last there comes a night when the sky overhead is filled with the calls of fast-flying geese, and morning dawns gusty and wet. As though at a broadcast signal the forest comes alive with squirrels in the trees and there is a constant "thump-thump-thump" of cones dropping from far-up branches. At first only firs—Douglas and grand will be taken, for these are nearest to ripeness, but within a few days all of the other species will be sought after and harvested. Their working method is simple and effective; for several hours a family of parents and half-grown progeny swarm over a tree, cutting cones until the earth below is literally paved with them. Then the pickers come down and begin caching, carrying cones in their jaws and tucking them into holes under roots and rocks, inside or beneath decaying logs and in caves which have been hollowed out and enlarged by succeeding generations of hoarders.

The speed at which these small creatures work and the strength they display are amazing. Douglasfir cones are from two to four inches long, too large for a squirrel to carry more than one at a time, so he must make a round trip between tree and cache for every cone that is stored. Ponderosa pine, silver fir and noble fir are heavy, often weighing more than the squirrel, so he drags them one at a time over distances of several yards. There are only a few hours of daylight in late autumn, yet a family of hoarders in that time will put away three or four bushels of prime cones, which they have selected carefully, using their keen sense of smell to identify those containing sound, edible seeds.

Cones are pitchy things and squirrels get themselves well smeared while gathering them. Yet each morning Gowack and his family come back to the job looking neat

and clean, as though they had been laundered during the night. Of course, it is impracticable to look in upon them in their nest or tree den, so we can only guess that they lick each other's fur, and that their saliva contains some powerful detergent that removes pitch from their coats.

Enter now the villain of this story, *Homo sapiens*, specifically the human cone stealer, a member of the race that for many decades after arrival in North America wasted the forests, caring little for either the principles or practices of forestry. At last he came to his senses here in Oregon as elsewhere, and during the past twenty years has worked, with increasing vigor, to restore tree growth upon cutover lands. In this drive to reforest the first essential is seeds, particularly seeds of conifers, which grow upon tall trees and can be harvested by acrobats in boatswain's chairs or picked from the shattered tops of timber felled for logging. Such methods are costly and uncertain, although both are used to a limited extent. An easier way is to rely upon little Gowack in the high country and his kin in other parts of the Pacific Northwest, compelling them to share with humans the cones put away in the earth.

A motley host invades the forests in autumn when the squirrels are harvesting and hoarding cones, and all are intent upon robbery. There are foresters and loggers and the latter's wives and children, Boy Scouts and their leaders, Indians alone and in groups and city folk who love to spend week-ends in the woods when there is a prospect of earning substantial sums by gathering cones to sell to seedsmen down in the valley. They come in small trucks and family cars, bringing pack-boards upon which to tote the heavy sacks of loot, and strange one-wheeled vehicles designed for the transportation of dead deer. Rarely do any of these gentry try to harvest cones directly from the trees—they plan simply to raid the caches of Gowack the high-climber. Cynically they declare that squirrels always hoard several times as much food as they can consume during the winter. Probably this is true, as obviously the rodents do not keep books, and certainly they are driven by an overpowering urge to store cones.

In some areas the idea persists that Indians when gathering cones always leave substantial residues in the caches they rob. Supposedly,



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they are in a measure kin to the wildlife of this great country the white man took from them. The writer once asked an Indian about this, but the red man merely shrugged his shoulders and looked down his nose. Even if such a custom were followed there is no assurance that food would be left for the rodents, since other raiders might enter the area and make off with whatever the Indians had left.

Apparently little Gowack manages to keep supplies of food adequate for his winter needs, even though thousands of sacks of cones are taken away by humans each year. Nature takes a hand in his behalf by frightening people away with snow storms; hoarding may go on for several weeks, with the robbers taking most of what the squirrels put away, then one day it begins to snow and men go out of the forest in a hurry, while the rodents continue to hoard, as they can drop cones in several inches of snow and find them again. Thus they are able to restore at least some of their caches before winter closes in.

There are other reasons why the animals seldom starve as a result of human greed. Demand for tree seeds varies according to species; Douglas-fir, noble and grand fir and hemlock are most sought after, and thousands of sacks are taken, while a few hundred sacks of each of the other species usually suffice. Besides, this is a very big country, several hundred thousand acres in extent. Improved roads are few and far between, so humans cannot cover it all in their search for squirrel caches. In time this woodland will be placed under more intensive management, more roads

will be constructed to open it up to forest harvesting and replanting. Doubtless the demand for tree seeds will increase, and the agencies having jurisdiction over these lands will find it necessary to put tight controls over cone collection, to the end that little Gowack may thrive and carry out his part in a highly satisfactory cooperative enterprise.

NOTE:

(Intensive forestry places a premium on timber of high quality. So foresters plan to meet future needs for cones by establishing orchards of genetically superior trees for seed production. A few seed orchards have been established already but it will be some time before the trees reach cone-bearing size.)

The first step in seed production is collecting the cones. Then they are brought in sacks to central extraction plants and there stored in cool sheds to season. The cones are dried in kiln chambers, after which the seeds are shaken out by being tumbled in rotating churns. Wing and cleaning are prosaic operations, as with other seeds; but the final product is more costly than most seeds.

Hundreds of foresters are at work, these days, extending the areas of regenerated woodlands in the Pacific Coast region. The actual task of replanting is done in two ways, by planting seedlings that have been grown two years or more in nurseries or by scattering seeds upon the ground from helicopters. In all this activity, potentially so important for our country, not the least important participant is the forester's small friend Gowack.

Drainage Versus Ducks

(From page 23)

areas are defined by the wildlife service.

Wildlife conservationists point out that acreage totals are deceiving, since many potholes valuable for ducks are less than an acre in size.

"We try to encourage farmers to sow grass," said a county SCS man. "There's a lot of North Dakota land that undoubtedly should go back to grass. But when a man is getting 20 bushels of wheat to the acre, he's not going to put the land into grass. Maybe the soil bank will help.

"Remember this: Regardless of the national economic situation and what anybody tells him about soil

conservation, the farmer will do the things he's entitled to do that will help him make a living."

Since F&WS cried alarm in 1949, the fight to save the wetlands has gathered great momentum. Dan Janzen, Minneapolis, regional chief of F&WS, called the problem to the attention of a federal interagency meeting soon after that. Last Nov. 7 he brought the facts up to date at another meeting of federal and state officials of the Missouri valley.

Minnesota began a wetlands acquisition program in 1951 with federal aid. Slow progress stirred citizens to raise funds in 1954; and be-

fore the end of that year, public pressure had led the legislature to appropriate \$200,000 to help the movement along toward its goal of 209,000 acres.

The National Wildlife Federation pitched in; and in 1955 its executive director, Ernest Swift, put on a nation-wide campaign with the slogan, "Save Our Wetlands." State groups spring up under the name, "Save Our Wetlands, Inc."

Early in 1956, the North and South Dakota Emergency Conservation Committee was organized and its alarms have gone in bulletin form to conservation groups and newspapers in all 48 states.

None of these people deny the right of a farmer to drain his own land. They argue simply that subsidization is inducing farmers to drain lands that otherwise would remain in a natural state, and at a time when production should be curtailed, rather than increased. They point out that SCS should be concentrating on other practices badly needed.

Plow furrows run uphill and down in North Dakota. On hilltops the subsoil shows through. Silt clogs the streams and drifts like dirty snow in roadside ditches. Too many farm buildings stand stark, without sheltering trees. Too much pasture land is overgrazed. And where roads pass between cutbanks, the line of scanty topsoil shows, sometimes only a few inches deep.

A good deal of this country consists of grass climax land. Nature, through the millenniums, conditioned the land until the thin topsoil finally was covered and held in place by native grasses, just as a good share of the land in the Great Lakes states evolved to a forest climax.

And just as the lake states, a generation or two ago, logged and burned away trees in search of a promised land of rich farmland, North Dakota has been plowing up the virgin sod and cultivating the soil. This reporter flew over half a dozen counties east of Bismarck in a small airplane, covered a thousand miles of road by automobile and walked over miles of terrain to inspect drained areas and observe the condition of the land. No contour farming was seen. There was some strip cropping.

Signs of erosion were everywhere. When the native grass is stripped off, this land begins to blow away with the wind and run away with the rain. Yet a great deal of land was in cultivation.

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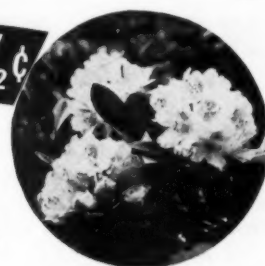
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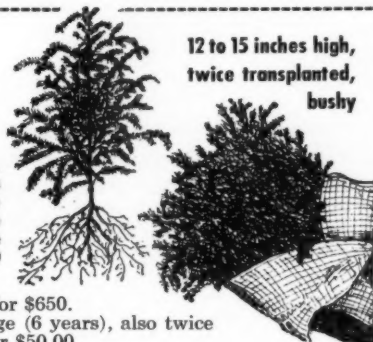
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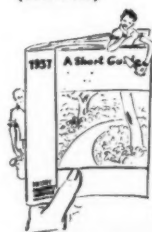
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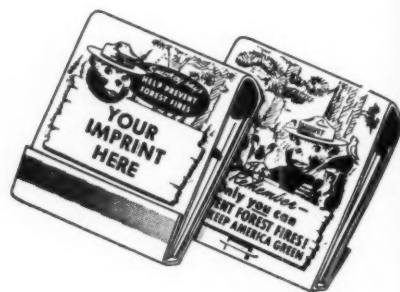
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Sod breaking has been encouraged by several years of abnormal precipitation in this semi-arid region, by price supports for crops and by federal aid for drainage. The soil bank, only a few months old, has led to more turning of native sod by men who hope that one year's crop will enable them to "retire" the new land from production under subsidy. This, of course, is a gamble, since present regulations will be reviewed before 1958. Possibly the newly broken land can be substituted for cropland which cannot be prevented from going into the soil bank reserve.

The forest states learned that nature was wiser than man and for more than a quarter century have been putting land back into forest. North Dakota eventually can be expected to learn the same lesson and let some of the land return to its destiny of grass.

The fight to end drainage seemed to be getting nowhere until the Soil Bank Act was passed by Congress. Then a group of conservation leaders called upon Secretary Benson and pointed out that this return to the philosophy of retiring croplands from production made it impossible for the agriculture department to justify continuing drainage to put more land into production under the Agricultural Conservation Program (ACP). They also made some very pointed comments.

H. R. Morgan, North Dakota's aggressive Game and Fish commissioner, who also is chairman of the Soil Bank committees of both the international and midwest associations of commissioners, told Benson bluntly that some of his men were trying to make the public believe that the agricultural program was doing more for wildlife indirectly than the state conservation departments and the wildlife service were doing collectively.

"They will result in inciting the farmers against the cause of wildlife conservation," he said. "We cannot afford to have our thinking split between two as important factions as farmers and sportsmen at this time. The cause of conservation and the national welfare are not being properly served while this feeling exists."

James W. Kimball, Minnesota's director of Game and Fish, told Benson that agriculturists and agronomists were generally agreed that the ultimate solution to conserving soil in the type of land under question was grassland farming. He added, "Drainage of wetlands retards

the transition to a grassland economy."

Swift reminded Benson of the farming failure in the forest areas of the lakes states. He recalled that 50 years ago agricultural experts had advocated drainage of much northern Minnesota and Michigan and central Wisconsin lands and pointed out that many of the resulting ditches since had been plugged at the taxpayers' expense; "and the areas are growing timber and wildlife."

Clarence Cottam, director of the Welder Wildlife Foundation (Tex-

as), informed Benson that a 15% sampling in four North Dakota counties indicated that 62% of the 1955 drainage referrals violated the new policy against bringing more land into production.

"We went to call on Benson as doubters," Morgan subsequently told this reporter, "but we found him to be a sincere individual, who listened to us with understanding, and we came away with cautious optimism. I think he will eliminate subsidized drainage from the agricultural program."



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Monument To A Conservationist

(From page 30)

Park was still under the jurisdiction of the War Department. Such other parks as existed at that time were cared for individually by various agencies. What work was done on them was carried on by the Department of Interior.

Arriving in Washington, Dorr turned the papers over to Frank Bond who was executive secretary to the Public Lands Commissioner. After studying the papers he advised Dorr to offer the lands to the government as the *Sieur de Monts National Monument*, under an act passed in 1906 under President Theodore Roosevelt. This act gave the president the power to set aside by proclamation any tract of land recommended to him by either the Secretary of War, the Secretary of Agriculture, or the Secretary of the Interior.

Dorr went to Franklin K. Lane, Secretary of the Interior for help. But by this time Frank Bond had given the deeds a closer study and he decided that the lands could not be accepted by the government unless two tracts of land shown on the

maps, but not owned by the Hancock County Trustees, could be acquired so that the entire Bar Harbor holdings could be bounded by a single line.

Dorr hurried to Boston to consult with President Eliot, and he told Dorr he would raise the necessary funds to purchase the land. Heartened by the promise, Dorr went to Bar Harbor and arranged to buy the land. He got the land without any trouble but he found that getting the titles in order to meet the exacting standards of the government was a long arduous task. Some of them went back to the time when Antoine de la Mothe Cadillac, soldier of fortune in the Acadian service, obtained a grant from the Province of Quebec giving him the Lordship or Seigneurie of the Isle of Mount Desert.

Tracing the titles proved to be a longer job than Dorr had anticipated and two years passed before the trustees' counsel, Harry Lyman, got them in order. By this time the war clouds that had spread over Europe were close to America. Consequently, when Dorr arrived in Washington with the papers, he found that most politicians were more interested in America's stand in the European struggle than they were in establishing national parks.

However, Dorr did not give up, and in due time he presented the papers, neatly bound in several bulky volumes, to Secretary of the Interior, Franklin K. Lane, asking him to forward them to the President with a recommendation of acceptance. Lane acted promptly but weeks passed without any action from President Wilson. Finally, Dorr learned that Secretary of Agriculture, Houston, who had great influence with the President, was opposing the plan.

One of Dorr's Boston friends, Charles Hamlin, was governor of the newly formed Federal Reserve Board, and he was a close friend of Secretary Houston. Dorr enlisted his aid to get the secretary to withdraw his objection, and he also enlisted the aid of President Eliot to whom Houston was indebted for kindness shown to him while he was a student at Harvard.

While Hamlin and Eliot were working on Houston, Dorr got Senator Johnson, Maine's only Democratic Senator in years, and Repre-



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sentative John A. Peters, to work on President Wilson. The combined effort was successful and on July 8, 1916, President Wilson signed a proclamation that made the holdings of the Hancock County Trustees of Public Reservations the Sier de Monts National Monument. But no money was appropriated to operate the project. Dorr promptly volunteered to become its first custodian at the lowest salary ever paid anyone in government service at that time—one dollar a month. When he received his first check of twenty-four dollars at the end of a two-year period he presented it to Mrs. Lane, the secretary's wife for her war time hospital.

With the park established, Dorr began to work for an appropriation to improve it. But by this time the United States had entered World War I and Representative Swager Sherly of Kentucky, head of the House Appropriations Committee, opposed any appropriations not directly connected with the war effort.

Dorr knew that Swager was a close personal friend of ex-President Theodore Roosevelt and he decided to enlist Roosevelt's aid in obtaining funds. He had met the former president, and he decided to telephone him and ask for his help. But the telephone company refused to give out Roosevelt's number and Dorr set out to find someone who knew it. Quite by chance, he met the former president's sister, Mrs. Douglass Robinson, who was an old acquaintance. She agreed to set up a luncheon date for Dorr with her brother.

Roosevelt expressed keen interest in Dorr's project and promised to use his influence with Swager to get an annual appropriation for the maintenance and improvement of the park. Chairman Swager was impressed by Roosevelt's interest in the project and agreed to work for an appropriation for the park. However, he suggested that since Lafayette's name had been a strong influence in the United States' entry into the European struggle, the name of the park be changed from Sier de Monts National Monument to Lafayette National Park.

Dorr agreed to the change and a bill was introduced to provide an annual appropriation for the improvement of the new park. The bill passed without any trouble, but before President Wilson got around to signing it, the war ended and he sailed for Europe to speak before

the League of Nations. Consequently, no action was taken on the bill until the President returned in February 1919. He signed it on the 26th of February. Dorr's six years of untiring labor was crowned with success, and the Lafayette National Park was on its way to becoming a great national playground.

For the next four years Dorr devoted all of his time to improving the park. In 1922, while he was dining at the home of a friend he sat next to Mrs. Warner G. Leeds, whose first husband had been John G. Moore. Moore was born in Steuben, Maine, and went to New York as

a young man. He went into the lumber business and soon became one of the top financiers in the country. He never lost interest in his native state and bought a large tract of land at Schoodic Point. He planned to develop it into a summer colony but he died before he could carry out the project.

Knowing that Dorr had always had a strong interest in the rock bound Schoodic Peninsula, she offered to give her share of the property to the park. Since Moore had two daughters by his first marriage, Mrs. Leeds could only donate one-third of the property. But in addi-

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tion to the gift, she offered to go to England and try to get the Moore daughters to donate their share. One of them had married Lord Lee and the other, Miss Faith Moore, had moved to England to be near her sister.

Unfortunately, Mrs. Leeds died before she got to England and her share of the Schoodic lands went to her adopted daughter, Joy. Since Joy was a minor, Mr. Leeds was named as her guardian. He felt that he would not be acting in the best interest of his ward if he donated the land to the park, but he offered to sell it at a reasonable figure. Upon learning this, the trustees of the park raised the money to close the deal by private subscription amongst the Bar Harbor summer colony.

Shortly after the deal was closed Dorr contacted Lady Lee and her sister. They agreed to give their share of Schoodic to the park on condition that it be given some other name than Lafayette. Dorr accepted the offer without any reservation for he always felt that, because of historical association, Acadia would be a more appropriate name.

Dorr acted promptly to get a bill introduced that would incorporate the Schoodic lands into the Bar Harbor holdings and change the name of the combined holdings to Acadia National Park. When that was accomplished he began working to get the Otter Creek radio station near Bar Harbor, moved to Schoodic Point.

He employed a radio expert from the Jefferson Physical Laboratory at Harvard and the tests he made indicated that Schoodic Point was one of the most receptive points in the entire United States for receiving radio messages from abroad.

However, the Secretary of the Navy was not too well impressed by the tests and Dorr worked for nearly a decade before the radio station was finally moved to Schoodic. In

the meantime, the Bar Harbor section of the park had developed nicely. John D. Rockefeller had spent large sums of money building horse and automobile roads over the mountains and along the seashore, and the annual appropriation for the maintenance of the park had provided funds for landscaping and general improvements.

By this time the depression had assumed major proportions and this helped to hold back the development of the Schoodic Point section. The Navy Department had finally agreed to the transfer of the station and Congress had appropriated \$250,000 to carry out the plan. But before work was started the depression was so bad all appropriations were cut by ten per cent. This was followed by the election of Roosevelt; and when he took office, all appropriations not under contract were impounded.

The new Director of the Budget, Lewis Douglas, issued orders that no funds should be released unless it was established that they had a direct bearing on the economic status of the community. Upon learning this, Dorr made a hurried trip to Washington to confer with Douglas. He found the Budget Director receptive to the plan for moving the station and funds were made available to start the work without any delay. The work progressed rapidly, and in February 1935 the radio station was established at Schoodic Point.

George Buckman Dorr died in Bar Harbor on August 5, 1944, at the age of 91. A wealthy bachelor he had devoted most of his life and part of his fortune to developing the park he loved.

Dorr wrote two volumes, *Acadia National Park its Origin and Background* and *Acadia National Park —its Growth and Development*. The last book was written after he had been stricken by total blindness.

Tornado In The Pines

(From page 21)

were blamed for being "front men" for politicians who wanted to cut the stately pines for personal profit.

Thus, through misunderstanding, as well as different interpretations of "intent," the invaluable, consecrated stand of timber stood, weakened within itself by members that were afflicted by age and infirmities at the time the storm came out of the south-west on the evening of August

18th. Undoubtedly these aged and infirm trees were among the first to yield to the storm's vicious blow, and the weight of these "falling giants" unquestionably contributed to the downfall of stronger trees that could have withstood the wind's fury. Yet the foresters freely admit that even with selective cutting they would have had a heavy loss in the "Cathedral" area on that memorable night,

but they think the loss would have been much less and more scattered than it was. As it is, or was, about every third downed tree shows some definite fault or infirmity in its trunk structure. Then too, there are any number of strong trees still standing that have suffered blows from falling neighbors and were injured to the extent that they will have to come down—how many of these were struck by trees that should have been removed, is of course, unknown.

But the same kind of thinking that brought about the "no cutting" ban swept its way through the public's mind following news of the storm's damage. At once there were moves to insist that the Department of Forest and Waters let the windfall lay. But already the newspapers were pointing out the blunder of forcing acceptance of the "no cutting" ban, so after a brief flurry the drive dwindled out. O. L. Mulhollen, district forester, stated, "I, personally, feel that some cleanup is necessary to protect surrounding trees from insect attack from the large population that will result from this mess, as well as to reduce the forest fire hazard created by this entanglement."

Other foresters concurred with Mr. Mulhollen's views, emphasizing the fact that the down timber created ideal conditions for the propagation of injurious insects and the forest fire hazard Mr. Mulhollen mentioned was real and genuine—not only from the standpoint of being a threat to the forest, but under the proper conditions and during the dry seasons of the year could become a dangerous threat to the tourists who visited the area to view the time-dried, tinder-like entanglement of pine and hemlock.

With these facts in mind, Secretary of Forest and Waters, M. K. Goddard, decided a complete and thorough cleanup of the area was required and the actual work of logging the area was commenced in November with the intention of having all of the work completed by early June of 1957. The present plan of the department is to sell some of the logs to private mills on bids, but to retain some for their own use, having them sawed on contract by nearby lumbermen.

Early estimates of the amount of saw-timber that would be realized from the cleanup operation were in the neighborhood of 750,000 board feet. This, however, climbed gradually, as men purporting to have a knowledge of lumbering questioned the estimate of the foresters, to a

cool one million board feet. Yet a further questioning of the foreman who is supervising the removal of the timber, an experienced lumberman who has spent a lifetime in the saw-timber woods, brought the most convincing estimate—"One whale of a lot," he said. Then jokingly, he explained that no one would definitely know until a final decision had been reached on the number of trees still standing that would have to be cut down.

Falling timber is still a threat to the workmen as apparently strong and unharmed trees crash to the ground without warning or reason, so there is little question that many of the standing monarchs will have to be removed. But the demolition of the "Cathedral of the Pines" was as complete on the eve of August 18th as it ever will be, even with the removal of a few stray "giants," for the cavernous hole that was ripped out of its very heart will leave a never-healing scar on its once vaulted "virginity." The sylvan-like "Cathedral of the Pines" will be no more. It is a sad and fateful loss to the conservationist, the nature-lover, the outdoorsman, and that special breed of men who infinitely love the forest primeval.

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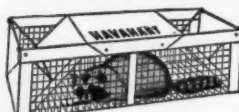
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Charcoal

(From page 51)

in the venture. Later, the concern was named the Delta Chemical and Iron Company.

A trend toward monopoly in the declining charcoal iron industry was noted before the first World War. The Charcoal Iron Company of America, with British capital took over the furnaces at Elk Rapids, Boyne City, Newberry, Manistique, Michigan, and Ashland, Wisconsin, and the Carp furnace at Marquette.

Most of the charcoal iron furnaces put out their fires after the first World War. Elk Rapids closed in 1921, Manistique in 1922, Boyne City in 1923, Ashland in 1924 and Cadillac in 1926.

Even the demand for charcoal wood chemicals and iron in the second World War failed to keep them alive. The Delta Chemical and Iron Company at Wells closed in 1943, the Antrim furnace at Mancelona in 1944 and the Newberry in 1945. Wood chemical plants of these firms also suspended operations. The "Last of the Mohicans" in the charcoal iron industry is the furnace at Lyles, Tennessee, owned and operated by the Tennessee Products Corporation.

Remnants of old charcoal kilns are still to be seen in the Upper Peninsula of Michigan. A group of the Schaffer kilns, still well preserved, are to be found on the Juneau farm at Wilson, near Escanaba. And, the Marquette County Historical Society has launched a movement to preserve the crumbling kilns near the Marquette city limits.

The dome-shaped structures of stone, brick and mortar, resembling large bee-hives, now attract the curiosity of modern tourists, who are quite unaware that the kilns are relics of a once-flourishing industry.

Most kilns were from 60 to 80 cord capacity, ranging from 25 to 35 feet in height. A cord of hardwood would produce about 50 bushels or 1,000 pounds of charcoal. The kilns were usually built in a row so that the wood could be hauled up a tramway and dumped into the top opening of each with a minimum of effort. Sand was also carried up the tramway in wheelbarrows and dumped into the kilns, sealing the top opening after the fire had been started in the enclosed pile of wood.

Each kiln was circled near its base with two rings of vent holes. These

holes were plugged with bricks or stones of similar size after burning of the wood was well under way. The hardwood was set afire at the bottom entrance, which was then "bricked up." The exterior of the kiln was usually whitewashed to make it more air-tight.

After the kiln was sealed up, the wood was allowed to burn 10 to 12 days, and then permitted to cool for about a week or more. When cooled, the charcoal was drawn out of the kiln and loaded into railroad cars for shipment to the furnaces. The man who operated the kilns couldn't sleep on the job. He had to check the kilns at regular intervals to see that the wood was burning properly. The only controls were the circular vents near the base of the kiln.

He plugged bricks in the openings to cut down burning speed and prevent any wind from fanning his charcoal into flames. He opened them if the burning was too slow. His only guides were the color and smell of the smoke. Many a kiln owner saw his many days of hard work go up into smoke due to carelessness in handling the fire controls. Some old-timers used to tell about kilns that were badly damaged by explosions, apparently caused by too tight sealing of the chamber.

During the second World War, the increased demand for charcoal revived the old pit-burning process in the backwoods communities of Ohio, West Virginia, North Carolina and other forest states.

During the Civil War, this primitive industry flourished as farmers burned wood to make charcoal for the blast furnaces that produced cannon balls for the armies of the North and South.

But in the more modern, global war, charcoal had additional uses. It was used in heat-treating materials, the production of brass and copper and high-grade tool steel. Carbon bisulphide, necessary for the production of viscose rayon, comes from charcoal. Charcoal briquettes or charketts are used in large volume for railroad dining car broilers and the heating of refrigerator cars. In a special form called "activated charcoal" it finds wide use as a water purifying agent and for decolorizing and deodorizing purposes.

Most of the charcoal is now produced in wood chemical plants, such

as the modern, well-regulated retort set-ups operated by the Cliffs-Dow Chemical Company at Marquette and the former Ford Motor Company plant, now owned and operated by the Kingsford Chemical Company at Iron Mountain. This destructive distillation process also produces a number of important wood chemicals.

But when the second World War came along, these large plants were not able to produce enough charcoal to meet the demand. The War Production Board, in cooperation with the Forest Service and other agencies, called upon farmers to revive the old pit-burning process. A number of farmers in Ohio, Kentucky and South Carolina responded to the call.

Open pit charcoal burning is the roughest sort of an industrial production process. On level ground in the woods, the farmers clear a circle of "hearth" about 25 feet in diameter. In this, around a central "chimney" they stack some 35 cords of wood in a double-decker arrangement of "slabs" in between the decks. The pile is covered with leaves and dirt, a fire is lighted in the chimney to set the pile burning. After a half hour, the chimney is sealed off and the pile allowed to smoke for about two weeks.

Getting the charcoal out when it's finished is called "drawing." An opening is dug in one side of the pit and the "drawer" gets out the charcoal as fast as he can with a special heavy, long-handled rake. Another collier works closely with him, dumping dirt back in the pit as fast as the charcoal is drawn out. This is done to prevent the opening from letting too much air in and starting a blaze. The charcoal is still hot and water must be on hand to quench any fire that may start. The charcoal, after being drawn, is allowed to cool in the open for 48 hours, before it is put into bags.

Now, the cook-out fad has accelerated the demand for charcoal. Public parks are equipped with picnic grills, and there are few backyards or patios that are not equipped with either the stationary or portable units.

As a result, even the old-fashioned charcoal kilns are coming back. A former Marshfield, Wisconsin man, Leo Van Ert, has built a 10-kiln plant on his timber land near Adams, Wisconsin.

About four years ago, Van Ert purchased the land for a Christmas tree plantation. He found it hard to keep a crew for the seasonal work

on the Christmas trees. He also had the problem of getting rid of oak trees that were blocking his uniform rows of Scotch and Norway pines.

Van Ert decided to produce charcoal from the oak trees, and thereby keep his men busy while they weren't working on Christmas trees. He had a difficult time getting information on the kiln process, but finally hired an old-time charcoal maker from Byesville, Ohio. The first batch of wood was fired in a brick kiln early in September. The charcoal enterprise is Van Ert Forest Products.

The Kingsford Chemical Company of Iron Mountain and the Cliffs-Dow Chemical Company produce a major portion of the charcoal in this country.

Incidentally, Cliffs-Dow has been cooperating with the Lake States Forest Experiment Station at Dukes, Michigan, in an experiment with a "portable" charcoal kiln. The company's main interest in the project is to learn whether charcoal can be made in the woods at a decent wage for the timber cutters. Results of the experiment, however, are not yet conclusive.

And who knows but that the outdoor cookery fad might revive the old pit burning process.

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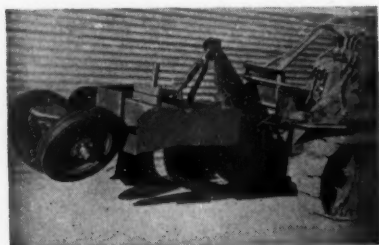
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A Connecticut Kiln In Iran

(From page 49)

northeastern province of Gorgan. Here all aspects of the problem would be attacked simultaneously, and an all-out effort would be made to find a solution.

Daland itself is not an attractive place, but it is on the main highway, and is in the center of a 12,000 acre royal domain forest. Here live 150 families. They grow cotton, rice, wheat and melons. In summer their livestock is in the mountains, and in winter it roams the forest. Their land is rich; but since their farming is primitive and they sell their crops ahead of sowing at a 50% discount, they remain desperately poor.

The surrounding forest has been under heavy pressure for years. There are patches in a primeval condition, but for the most part it has been heavily grazed and picked over for usable timber. Dominating all is the magnificent *Quercus castaneaefolia*. There is maple, ash, basswood, elm and alder of sawtimber size. Persimmon here develops into a fine tree, as does ironwood. Two genera, *Zelkova* and *Parrotia*, are not found in the New World. Some preliminary cruising revealed an average of 25 cords of wood to the acre, at least half of which was culled for any present or future use other than charcoal wood.

The first step in the project was to rent a piece of land for the station from the landlord of the village. He agreed to rent it, free of charge, for forty years. Here we planned to put up a residence for the director, a garage, and warehouse, and to dig a deep well from which the villagers could get pure water to replace their own uncertain and contaminated supply. Somehow, slowly and with seemingly endless delays, the buildings were planned, built and finally occupied.

In the meantime, a surveying crew had arrived and was running an exterior traverse around the forest. For the first time in its history, Iran had a forest map.

Now we had to think about a pasture. After cutting operations, the forest would have to be protected from grazing. There is no use, we argued, in expecting the villagers to keep their stock out of cut-over areas if no alternative pasture is provided. Therefore in the zone around the village that was neither field nor

forest, we chose 25 acres and began to clear it. As the bulldozer worked it uncovered deep, black, rich soil. Half of the area was plowed and sown with American seed to provide fall and winter pasture. Half was merely cleared and fenced, and left to the native legumes to provide for spring and summer.

These 25 acres had enough trees on them to yield a total of 300 cords of charcoal wood. Soon a crew of men from Daland was busy, with American axes and saws, cutting and splitting this wood, and transporting it to the charcoal station.

The season was now April. The worst rains; cold and mud were over, and the days were as bright and sparkling as the finest days at home. The buildings were not up, or even started, but the wood was ready for the charcoal kilns.

For some time the International Cooperation Administration in Washington had been negotiating with Mr. Alexis Olson of the Connecticut Agricultural Experiment Station. He was invited to come to Iran for three months to build charcoal kilns of the type that he had helped to design. He reached Tehran early in April, and within ten days he was hard at work in Daland.

It is hard to imagine or describe the ludicrous and agonizing, yet often inspiring, atmosphere in which technical aid operates. Three of us crowded into one tiny room until the owner's arrival forced us into tents. Then the wind and rains came, and the heat became unbearable. We moved into a farmhouse half a mile away and shared it with a family of ten. We ate army rations until the "corn beef hash" was indistinguishable from the "vegetable stew." When we had brick we had no mortar; and when there was mortar, there was no brick. The truck broke down, the masons quit, and supplies did not arrive.

But slowly the kilns were taking shape, first a small, 2-cord kiln, then two large ones. Moreover they worked, not just half-way, but really well. Soon they were producing tons of chunky, black charcoal, the kind that is light and uniform to the core, and that tinkles when it drops.

Nor in odd times was Alex Olson idle. He was showing the woods gang how to file and use their saws,

how to sharpen their axes and grind nicks out of the blade. As a side line, he set up a small treating plant that was producing posts treated with creosote, copper sulphate and zinc chloride. His work will long be remembered in Daland.

In the meantime, the third phase was underway. At numerous meetings with the headmen the question of starting a village cooperative charcoal company had been discussed. Under the guidance of Point IV's Community Development Division, such a co-op was organized in August; and for the first time in their lives the villagers participated in a free, democratic election of their own representatives. It began with eighty members, each of whom bought a share for about \$1.25.

Of course \$100 is a small sum of money with which to begin a charcoal operation. But from the first we had planned to provide capital from another source. Three hundred cords of wood which were cut on the pastures had been turned into charcoal and sold for \$1,500. Here was the working capital for the village company. It could now afford to hire workers and accumulate wood at the kilns. Villagers who, during the off season for farming, used to drift about in despondency, could now cut wood at fair wages. Moreover, the profits of the company would be channelled into village improvements such as a school and clinic.

The advantages to Daland were clear, but what about the Iranian Forest Service which manages the forest, and the Royal Domain that owns it?

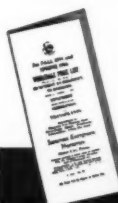
For the first time, the Forest Service was in a position to manage a piece of woodland. All it asked of the villagers was that they cut designated trees in designated areas. It now had a regular outlet for the cull wood, and would receive money for it instead of losing through theft. The first year called for 125 acres of cutting. With a cutting cycle of 20 years, the first block of 2500 acres would be worked over at this same rate. Cutting would remove the cull trees and leave a better stand for the future. At the end of each year's operations, the cut-over land would be closed to grazing, but the pastures would be expanded. In this way the forest would gradually be brought under management.

At the present time the Daland Charcoal Cooperative is in operation and is producing charcoal strictly from cull wood which is not only

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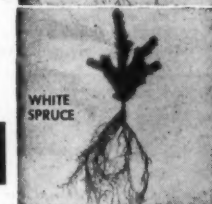


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otherwise wasted but is a positive detriment to the better forest growth. The Iranian Forest Service is planning to set up three more such forest management centers; and as for the Connecticut kilns, they are being built as fast as we can get them up.

The race between the wonderful

growth and recuperative powers of the Caspian forest on the one hand, and the forces of destruction on the other, is still a close one. Charcoal cutting is a long way from being under control. But thanks to the aid of Point IV and the Iranian Forest Service, a start towards a solution has been made.

The Flying Meathook

(From page 17)

ence with them. So when horned owls began picking off hard-to-come-by turkey poults and fat friers, owls developed a bad reputation from which they are, in a more enlightened age, only beginning to recover. You can still find hunters who take great pride in blasting a harmless little screech owl into oblivion, simply because it's an owl. If owls had a union, the great horned owl would have lost his working papers long ago.

Certainly the great horned owl is the toughest member of the breed, and in a body no heavier than that of a good-sized roasting chicken it packs plenty of death-dealing power, strength, fury, and sheer guts. An owl will attack anything that moves in the woods up to three times its own weight. They have been known to kill full-grown Canada honkers and wild turkeys, although they are greater threats to the young of these species. There are even records of them attacking bald eagles, the attacks occurring at night and probably representing cases of mistaken identity. When the young of a horned owl are molested or threatened, even by a human being, the mother owl will attack unhesitatingly. Sometimes the first warning that a hiker has that he has ventured too close to an owl's nest will be a savage blow in the back of the head delivered by eight out-thrust, needle-sharp talons backed by five pounds of sinew, bones, and righteous anger. The flight of the owl, because of its soft wing feathers, is as silent as mist striking velvet.

Three boys near Washington, D. C., two winters ago, got the fright of their lives, when they were attacked by a bird while robbing an "eagle" nest in a low tree. Although frightened they captured one of the young eagles, which grew up to be a fine great horned owl. Frank and John Craighead, who probably have conducted more practical research into the habits of birds of prey than

any other four men in America, have been attacked often while banding young owls and have filmed one such incident for TV and lecture use. In this filmed sequence, the mother owl is seen striking repeatedly, ripping shirt and flesh.

With anything from the size of the turkey on down, what the horned owl attacks it usually kills. The two-inch long, curved black talons are among Nature's original death-dealing weapons. The owls feathered legs are solid muscle and tendon as thick as a small boy's wrist. The rope-like tendon that closes the claws runs through a groove in the bird's "heel" so that when the leg is flexed the claws close automatically with great force. When the owl strikes a victim, the force of its attack automatically flexes the leg, driving the out-thrust claws deep into flesh and sinew.

I had a first-hand and nearly painful lesson in the penetrating power of an owl's talons when a poultry farmer called the wildlife and forestry department of the University of Massachusetts to report that he had a big horned owl caught in a wood-chuck trap and would we please come and take the blasted critter off his property before he knocked it in the head. Dr. R. E. Trippensee, professor of wildlife management, and I raced out to rescue the prize before added harm befell it since we were, at that time, interested in obtaining a good specimen for study purposes. The prisoner was a handsome and particularly large mature female. By use of a pair of "come-along sticks," three-foot-long wooden staves with leather nooses at the end, we freed the bird from the trap and transferred her to a wooden poultry crate loaned to us by the farmer. The operation went smoothly, but in order to keep scientific records of the bird it was necessary to obtain detailed measurements and weight records before transferring her to a permanent home in the department's

live animal collection. Trip managed to get a noose over one foot with the stick while I made a grab at the other with gloved hands. Things appeared to be going nicely as we prepared to shove five pounds of beak-snapping fury into a weighing cone; but somehow the owl received enough slack to reach my hand with one of its talons. The claw closed through two layers of thick horsehide, just brushing the skin of my hand, as though there were nothing there. Quite aware that my own hide would be inadequate protection for even a small Shetland pony, I handled horned owls with caution and respect from that time on.

The female great horned owl, like that of all birds of prey, is not only deadlier but considerably larger and huskier than her somewhat runty lord and master. A big hen owl will outweigh her mate by as much as a pound and outmeasure him by four inches from beak to tail.

The great horned owl is one of the finest night hunting machines ever fashioned by nature. Its characteristic huge yellow eyes, like those of other nocturnal animals are adapted through size and structure for magnifying the intensity of dim light—the original natural snooper-scope. Even the rosettes of stiff feathers around the eye sockets probably play some function in catching and magnifying dim reflected light. Although particularly adapted for night life, the owl is far from blind in broad daylight. I have seen horned owls hunting in deep woods at high noon on a sunny day, and quite commonly they can be seen cruising their hunting territories after dawn and before dusk.

When hunting, the horned owl either perches silently on a dead tree stub surveying the landscape with its huge staring eyes or quarters the hunting territory on silent pinions, for all the world like a flying bird dog. Any small bird or mammal that it sees will be attacked immediately in a powerful silent rush. In nearly every instance, the fate of its victim is instantaneous and painless oblivion. If the animal is too large to be killed by the first terrible stoop of the attacking owl, it is dispatched promptly by a savage blow of the hooked beak to the base of the skull. The head usually is torn off larger birds or mammals the size of a grouse or rabbit and the remains are carried to a "butcher block" for quartering. Small birds and mammals are gulped



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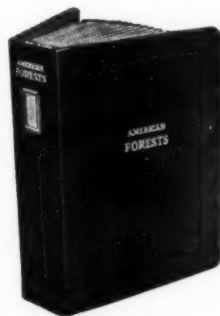
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down whole. Feathers, bones, and other indigestible portions of the meal are regurgitated in the form of pellets, a habit common to all hawks and owls.

Except when young, and young horned owls usually are well protected, the owl has few natural enemies but is itself a predator upon nearly every other animal in its own weight class living in the woods and fields. It will take and consume small foxes, hawks, and other owls with the same relish that it executes rabbits, hares, and grouse. Where they are abundant, skunks appear to form a highly preferred part of its diet; every mature wild horned owl that I have been near carried the pungent reminder of a recent skunk dinner. The porcupine would appear to be one animal immune to its attacks, but in the North it is not an uncommon occurrence to find porcupine quills in owl pellets or to find owls carrying the stubs of porcupine quills embedded in their hides. House cats wandering along woodland trails in search of other housecats or rabbits often end up in the larder of an owl family.

Crows and owls hate one another with blind unrelenting fury. In fact, one of the best methods of locating a horned owl is to listen for the mobbing call of the crow and to sneak up on the flock as it is occupied with its victim. Usually the object of the commotion will turn out to be a horned owl bearing the ordeal with quiet but deadly dignity, with nothing but an occasional lightning-fast twist of the head or a snapping of the beak betraying its annoyance. At night, as likely as not, it will dine on crow. As every crow hunter knows, nothing beats a live owl as a decoy for the black cornfield raiders. Old owls are practically untamable, but young ones taken from the nest become quite docile and make interesting pets.

There is considerable official difference of opinion among the scientists as to the economic importance of the great horned owl. To the poultry farmer or game breeder the horned owl is anathema. When one of them locates a poultry roost or a game farm where the birds are unprotected by wire, they will return every night to pick off a fat pullet, poult, pheasant or gosling until killed or fenced out. Killing an owl while it is in the act of doing damage is no easy matter because of the bird's nocturnal habits. Even when one is being mobbed by crows and

its presence is known, the stalk must be made cautiously, since the least sign of human presence will send it soaring away like a wraith through the forest, its passage marked by the calls of its noisy retinue of annoyers. Steel traps set in its roosting places near poultry pens are used by many farmers to control their depredations.

On the other hand, to the orchardist, grain farmer or forester, the horned owl is the greatest living mouse and rat trap ever created. A meadowmouse or a fat rat is nothing but a snack for a large owl, and it will consume dozens in a single night. A squirrel or small rabbit is a good full meal, but the digestive processes of the owl are efficient and its metabolism high; a pound of fresh meat every other day is required to keep a large owl from getting that gnawing feeling.

From the standpoint of the sportsman, the old notion that predation is all bad has been discredited. Studies have shown it to be pretty much a self-regulating phenomenon. It was once thought that every owl killed meant that all of its potential meals would be saved for the benefit of the hunter. When predation is removed, however, other factors take place as drains on the game populations. And of course, the owl never preys exclusively on one species of bird or mammal unless it finds easy pickings tailor-made for its raids in the form of an exposed poultry roost or open-range game farm. Many species that it kills prey upon or compete with game species. Practically all states now have dropped the bounty on great horned owls although poultry associations and some counties put a price on the big bird's head. Connecticut's recently enacted predatory bird law protects all hawks and owls from indiscriminate shooting, although provisions are made for farmers and game breeders to kill birds found taking livestock.

For myself I confess to a certain admiration and affection for the great horned owl. It is a killer, to be sure, but it kills only to keep itself and its young alive; and there is considerable doubt that its presence ever affects local game numbers very materially. Its rousing whoops and screams always lift the short hairs on the back of my neck when I hear them in the woods on a cold winter night. When I no longer can hear them, something of America's wild past will have died.

Pay-As-You-Go State Parks

(From page 14)

sons. Standard cabins could be obtained for as low as \$35 a week, and rustic cabins for \$25 a week for two.

During the past ten years West Virginia's state parks have been able to accommodate only about one-fifth of the potential customers seeking cabins during vacation periods. As a result, the date for accepting applications has been advanced to January 15. West Virginia residents are given priority from January 15th, after which all applications are processed in the order received. Cabins are rented for either one or two week periods, June to September. At other times they can be secured by the day, weekend or week.

Comforts of a modern hotel are available at the new lodges, where rooms may be secured by the day, weekend, week or longer. Reservations are needed over holiday weekends. Rates are comparable to hotels in nearby towns and cities, and res-

taurant prices equal those in town eating places.

About one aspect of the new park program, West Virginia conservationists are most emphatic—they are not in competition with private enterprise. "We don't want to be in the hotel or motel or any other business," Director Johnson declared. "Despite the attractions that the Mountain State has to offer to visitors, we have not yet been able to lure local or outside capital into the promotion of tourism in West Virginia. However, as we develop recreational parks in the state we feel that satellite tourist promotions under private enterprise will bring a new day to our economy."

Official figures, showing that some \$172,000,000 was spent in West Virginia by out-of-state people in 1955, indicate rather convincingly that the Mountain State has a better than even chance of making a go of its pay-as-you-go park plan.

Industry Grows Trees

(From page 19)

The annual spring planting of trees is usually a gala event in Wisconsin, one which gets a great deal of newspaper publicity. In 1955 the tree plantings went on in 20 north central counties from April 22 to May 10.

During this period trucks furnished by Trees for Tomorrow, Inc., made the rounds of distribution points at which seedlings were handed over to land owners. Under the distribution plan, the farmer can plant his own trees or pay for machine-planting them. The tree planting machine rents for \$3.00 per hour, if the land owner furnishes a man to help. Such a machine can plant about 10,000 trees daily. If the landowner wishes to hire all labor for the job, along with the machine, the cost runs to approximately \$15.00 per thousand trees. Trained foresters are on hand to direct operations and talk to owners about tree care.

At the low cost of 10 cents per acre, Trees for Tomorrow, Inc., offers general forest management to interested land owners. This service includes aerial photographs of the land owner's forest property, colored maps showing location of dif-

ferent tree species and their diameter classification, a written supplement keyed to the map and covering such details as species and size, where trees should be planted by hand or by machine, where trees should be harvested, and other practices.

If the land owner wishes to have his trees estimated for lumber volume or marking for harvest, a charge of \$1.50 per hour is assessed with the land owner furnishing one man to assist with the work. The idea of making a small charge for such valuable technical service is based upon the fact that when a man pays for something, he values it more.

Those who plant trees and grow them for beauty as well as for profit need to know how to care for them properly, and so the Trees for Tomorrow organization set up an "outdoor forestry school" in 1945 to aid in giving adequate instruction in forestry. The school is a large log camp at picturesque Eagle River, owned by the U. S. Department of Agriculture, and formerly used by the Civilian Conservation Corp. in the 1930's to train foresters. Trees for Tomorrow, Inc., made an agreement with the department to lease

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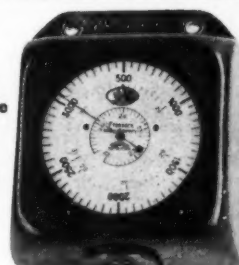


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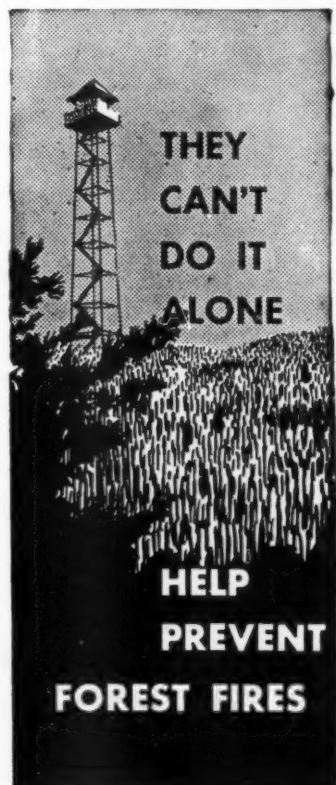
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THE AMERICAN FORESTRY ASSOCIATION

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the camp and operate it on a non-profit basis.

The forestry college consists of a combination administration building and lecture hall, two dormitories and an annex, a dining hall and a forest products exhibit building.

More than 100 staff representatives who head the various parts of the camp program are drawn from industry, federal and state agencies, colleges and high schools. They include educators, foresters, soil specialists, water engineers, fish biologists and game managers.

There are three types of people who come to the Trees for Tomorrow, Inc., camp to study forestry. They are:

1. College students. Each summer the Wisconsin State Colleges sponsor a five week, six credit course in resource education for Wisconsin teachers. Last year 56 teachers from 37 Wisconsin communities took the course and prepared study units for use in their own schools. Many forestry and conservation students from out of state colleges also come to the camp for brief tours.

2. High school students. About 1,000 visit the camp each year in groups of from 50 to 75. They spend three days in camp and have a full schedule to follow. The over all course for them is based on tested classroom techniques in resource study. Group participation is featured on field trips and written quizzes are held. Merit badges are awarded to winners of the three highest grades.

Instructors report that the high school students learn very well out in nature's classroom. For example, the high schoolers cut soil profiles to show the topsoil, depth of topsoil, and apparent rock. They map soils with a hand level and soil augur. The hand level is used to determine the degree of slope in setting up a plan for good land management.

Water, small stream and wildlife management—all are shown and demonstrated. Groups learn how trees grow at a nursery. They visit industrial, state and national forests. They see planting sites, plant a tree, watch pulpwood operations and timber sales, and see demonstrations of the state's outstanding forest fire fighting department.

About 200 miles are covered by each high school group while at camp. Cookouts are served in the field, and there is also a daily recreational program. Many students learn enough in three days to make

up a School Forest Prospectus Book, so that they have a workbook for their classes. Trees for Tomorrow personnel help with the projects, including map and other detail work.

3. Visiting organizations. Many state, industrial, civic, fraternal, church and other groups visit the camp and are taken on educational tours. Plant pathologists from Scotland, Peru, Brazil and India, experts on genetics from many sections of this country, students from Germany and Greece, have visited this forest school and studied the program very carefully. Many students have seen in clear perspective the interdependence of forests, soils, water and wildlife. They have learned that forests are living resources that can be harvested and yet maintained. By studying resources at first hand, many students have realized the social and economic significance of wise resource management.

Last year, Trees for Tomorrow, Inc., began to assess its progress in terms of inspiring private land owners, including many farmers, to carry on the forestry program after having had free trees and help for several years. Survey results were very encouraging. Over 50 per cent of those replying who were originally only interested in planting trees, now want to do forestry management, the crux of the forestry problem. About 25 percent want to do machine planting. All told, those replying want to plant more than 15 million trees, which is better than twice the number of trees distributed in 11 years by Trees for Tomorrow, Inc.

An outgrowth of this forestry education, too, has been the establishment of a number of county memorial forests in Wisconsin. These forests are living tributes to boys and girls who gave up their lives in the service of their country. Executive director, M. M. Taylor, says that Trees for Tomorrow, Inc., helps communities plan and establish such forests.

The small forest land program also receives recognition through Trees for Tomorrow's certificate of merit and roadside insignia awards for exceptional forest management. Quite a number of these awards have been given to private land owners in the past few years, indicating much practical application of good forestry principles.

While the economic results of the Trees for Tomorrow, Inc., program are easily evidenced in central and

northern Wisconsin where thousands of acres of new trees are flourishing, it has done something, too, for the minds and souls of youngsters and adults who have attended camp instructional sessions under the trees. Many have come away with a greater love and appreciation for trees and their contributions to man's spiritual and economic welfare.

How They Modify Weather

(From page 27)

probably shout.) The crystals, riding the carefully plotted winds, rise up and drift into the clouds. The trigger is pulled . . .

At, say 12 thousand feet, artificial nucleation or crystal-forming begins. This, you will remember, is at a much lower altitude than would occur "naturally." Zooming upward by the drafts inside the cloud to some 25 thousand feet, the silver iodide crystal is now a hexagonal piece of ice. Actually too heavy to float upward, it drops—to change to a snowflake at around 15 thousand feet. Still dropping, it descends to below the base of the cloud (10 thousand feet) where the warm temperatures convert the frozen bit of moisture to a rain drop.

During this whole process, the puffy, white cloud has changed in appearance to a smoothed-out, curtain-like formation.

In a practical sense, does weather modifying pay off?

Senator Francis Case of South Dakota, himself interested in farming, is behind legislation in Washington on "weather modification." (Some years ago, he hired a pilot to spread dry ice over the clouds above a South Dakota wheat field. When the rain broke loose, one editor protested: "How lucky can a politician get!"). The Senator's office says one "successful" rain-making contractor alone, over a period of several years, serves almost a third of a million acres in the United States. That's ten or twelve times as many acres as is under irrigation.

In another statement, Senator Case mentions a big fruit company seeding clouds to break up a powerful hail-storm that was brewing. And big hydroelectric companies bringing about rain to fill up their dams. Also how clouds were caused to "rain out" forest fires.

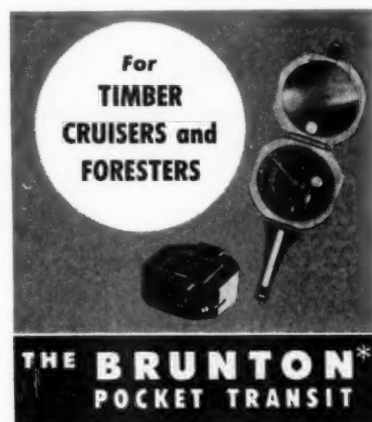
One writer tells how the level of a lake-reservoir supplying a city was

raised by "artificial" rain; and the flow of stream floating barges was increased. Also how the constructors of big outdoor projects were benefited by weather modification. Costs were as little as 2c per acre.

The "business territory" of the Irving P. Krick firm covers practically all of western United States—some seventeen states. "Starting the cloud-treating generators in the different parts of the country at the right time," says the company, "becomes a considerable problem. Instructions from Denver are by teletype or telephone. Into the Denver headquarters hourly data from some 500 reporting stations pour constantly. An up-to-the-minute story on North American weather is plotted on maps, charts, graphs and other quickly-visualized devices. The place reminds you of an airport control center."

The Krick scientists claim such records as increasing wheat yields in a 100,000 acre region in Horse Heaven Hills, Washington, almost three-fold . . . of tremendous increases in snowfall—needed for irrigation water in summer—in New Mexico, Utah and Colorado . . . and of striking weather-changes benefiting western Nebraska and eastern Wyoming grain-growers and stock-raisers. Moreover, they claim good control and "targeting" of their moisture-making techniques.

All these things would have proven tremendously fascinating to the first American to observe our West-to-East, upper-strata weather movement—the then-youthful Benjamin Franklin. Today, it looks like our youngsters may enter an exciting career in weather modification. For, led by American know-how, the "rain-makers" have operated not only in this country, but also in Europe, Israel, Tunisia, Japan, Formosa, India, Australia, Scandinavia, Turkey, Egypt, Arabia, Cuba and Canada.



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10 Years In A Woodlot

(From page 16)

the lake glint and toss in the sun as they head for the outlet where, lost forever in the flow of the tiny rill, they will tumble, fall and glide toward the oblivion of the sea. Take two walks and the element of time will come with you into the woods to stay. They are not what they were yesterday, much less the season before, or two or three or ten before that. Nor will they be the same a year or two hence, nor as long as man walks in their shade and beyond.

My favorite time is the hazy, mellow end of October, the last, lazy drawl of midsummer stripped of green finery and lapsed behind the earlier frost and chills. With scarcely a dawn or high noon, the days saunter through the radiant glow of an autumnal dusk, seeming to pause before the long, cold night of winter. Now the evergreens stand out against a backdrop of winter, dulled because the hardwoods have lost the wild-fire riot of leaves, one by one to the ground. The bleak pattern of their crowns show how far they have struggled and grown in one more season of racing for space and light as they work out their ways, stem by stem, in ever-changing patterns of growth.

These patterns fit into cyclical changes of forest type that require centuries to close. The nimble first-comers like pin cherry and poplar soon fall into decadence as black cherry and ash hem in closer and closer. These reach upward with slender trunks and narrow crowns while the red oaks must win or lose with a stout stem and heavy, spreading branches. Come the tolerant, shade-loving, slow-growing sugar maple and beech, and the light green

feathery foliage of the hemlocks. Up and wider these last move out of the seedlings and brush, into and over the canopy of hardwoods, until their days of climax have come after three or more centuries. Hereabouts the great old hemlocks have long since gone to the sawmill and are scattered about as homes and barns. Now only piles of hemlock bark, peeled too late for the tanneries, sink slowly into the leaves and duff of the forest floor.

The old fields see yet swifter changes. Once held clear by the ceaseless labor of man, they are now yielding to the forest trees that move out from the old stone walls and fence rows and swamps to fill up the void where men have plowed and reaped. Red maple and pines come as chance may direct, lovely forerunners of the forest to come. Red spruce, poplar and sugar maple come in squads to drive out the grasses, the wildflowers and the shrubs. In a few seasons all the gay colors and heady odors of the old field are lost to the forest, lost like the oats and hay before them over which the sickle-bars clanked and the wagons groaned.

American forests are works of art, creators and reflectors of moods, sharpeners of memories and of hopes. Someday all their trees will all be straight and tall, sound and clear. The forester's skill will heal the ugly scars of insects and parasites and the cross force of wind, and will harvest each tree carefully and fully for the use of his fellow men. Then their owners, the four and a half million American citizens who control this vast complex of species, site and type, will not have failed in their proud heritage.

Forest Forum

(From page 5)

that Star Island and Norway Beach were ideal localities for summer homesites which would enhance his popularity with Cass Lake citizens and bring in \$10.00 each, annually.

The next time the author saw these magnificent stands of veteran trees, they were solidly blocked up into homesites, with substantial cottages facing the beach and out-houses facing the road. In this case at least, the policy of allowing "no homes within sight of highways or lakes, near public use areas, or scenic attractions," had not yet been formulated!

But the significance of these developments lay in the fact that, although re-

peated efforts have been made to terminate these leases and get rid of this private monopoly of the most valuable and practically the only area of public park and recreational land on Cass Lake, the homes are still there, with no prospect of removal.

Actuated by this example, it happened that when, under the Weeks Law, large areas of national forest land had been purchased in New Hampshire and Vermont, the Forest Service announced that it planned to apply the summer homesite regulations to these forests, the late Philip Ayres, Secretary of the Society for Pro-

(Turn to page 79)

What's NEWS across the nation

A FOREST FIRE THAT COST THE LIVES OF 11 FIREFIGHTERS on the Cleveland National Forest in California on November 25 was investigated last month by a Forest Service Board of Review. No evidence of negligence was found on the part of individuals conducting the fire operation, the Board said.

SCENE OF THE TRAGEDY WAS THE SAN DIEGO RIVER CANYON. The fire had quieted in this vicinity about 4:30 p.m. on November 25. When the night shift came on at 7 p.m. the 18 members resumed construction of a fireline to the river bed. Another crew of 20 dropped back on the rim and began burning out a swath 10 to 40 feet wide from the tractor fireline—which is a normal fire control method, the report said.

ALL THAT DAY THE MAIN FIRE HAD BEEN BURNING against the wind slowly up the river canyon with occasional short runs up the side ridges and ravines, eyewitnesses said. The day shift had cleared by tractor a fireline along the top of the canyon rim to be used as a control point if the fire spread that far. In order to stop the fire's travel up the river canyon they had started to clear a line down a ridge from the canyon rim to the dry river bed in the floor of the canyon.

THE NIGHT SHIFT WAS CARRYING OUT ITS MISSION when a foreman on the fireline near the rim saw the fire in the canyon flare up and start a run towards the ridge on which the men were working. He ordered the men out even though at that time he did not consider the situation critical. The men started up the trail at a normal pace. When the fire started to gain speed, the foreman yelled to the men to "Hurry up!" At that moment the fire seemed to explode and enveloped 11 of the men before they could reach the top. Seven escaped.

WHAT CAUSED SUCH A SUDDEN EXPLOSION? The Board of Review does not provide a flat answer. Probable answer may have been that a pocket of unburned gases carried up the chimney-like ravine had been trapped by a cross current of wind at the rim. A sudden updraft that caused the fire to spurt toward the rim may have struck this gas pocket before it was dissipated. In that event, the result would have been the type of explosion that enveloped eleven of 18 men in the canyon. Failure of the withdrawing firemen to reach the rim also could have been due in part to sudden loss of oxygen that made breathing and consequently climbing difficult. A number of fire fighters in the past have died of suffocation rather than actual envelopment by flames.

THIS CALIFORNIA HOLOCAUST recalls to mind a somewhat similar blowup in Florida in March of last year. At sundown firefighters thought they had corralled what appeared to be another routine fire. However, at 9 p.m. the humidity dropped, the wind shifted and also increased in velocity. Unknown to the fire fighters a cold, dry front was passing over the area. This change turned the fire into a raging inferno that traveled between six and seven miles within the next hour. Twenty-seven hours later the fire was under control again but 110,000 acres of choice timber had been blackened.

THESE TWO FIRES, ON OPPOSITE SIDES OF A CONTINENT, had one common factor--unpredictable weather. In short, as AFA Chief Forester Kenneth B. Pomeroy says, "We are face to face with a vast unknown that has not as yet been penetrated by fire weather research. Until research, backed by sufficient appropriations, comes up with solid answers we will continue to experience more blowups and very likely more loss of life. In view of the fact that firefighters defend both the

(Turn to next page)

land and the people on it, the public should never hesitate in recommending adequate research on this program until it is licked."

COMMENTING ON THE TRAGEDY, Chief R. E. McArdle, of the Forest Service, said bluntly, "Fighting forest fire is a dangerous business. We could have hardly had more experienced or better-trained men on this fire. These men were experienced in ordinary fire behavior, yet something happened here and happened in a few minutes that caused fire unexpectedly to blow up. We need to find out what combination of conditions caused this so that we can be alert to detect these conditions and avoid repetition of this tragic accident."

FOLLOWING ONE OF THE MOST NIGHTMARISH Decembers in California fire history, Secretary of Agriculture Benson praised the thousands of firefighters for their heroic and successful efforts to contain the recent disastrous brush fires in Los Angeles and Ventura counties. The driest December for half a century in Southern California, extremely low humidity, tinder dry fuels and 80 miles per hour winds combined to make quick control of these fires impossible. Although at no time did these fires threaten national forest lands, the Secretary expressed satisfaction with the prompt response of his department's forest fire fighting forces to requests for assistance by the local fire fighting organizations. Forest Service personnel and equipment worked on the Zuma fire and at the request of Los Angeles County took over responsibility for control of the Hume fire.

SECRETARY BENSON SINGLED OUT FOR SPECIAL COMMENDATION the splendid cooperation of many public and private agencies involved in the control of these blazes. He said this may have been the largest single example of mutual aid in forest fire history. All told, over 40,000 acres were burned and 67 homes destroyed by three principal fires. While public attention naturally focused on these three large fires which were so difficult to control and which caused the bulk of the damage, more than a dozen other fires were successfully controlled on national forests and private lands during the same critical period. Secretary Benson pointed out that each of these fires might also have become a major conflagration if fire control experts had not had the foresight to keep forces in reserve for just such contingencies.

LAST MONTH THE WHOLE STATE WAS BREATHING A SIGH OF RELIEF as rains fell on parched earth early in the month and stringent fire regulations were relaxed by the State Forester. Meanwhile, as Secretary Benson pointed out, Californians in afflicted areas face a difficult choice: Remove flammable brush and be exposed to heavy flood damage, or leave the brush and chance such disasters as those just witnessed. One thing is certain. Additional research is sorely needed to determine the best plant cover and soil treatment necessary to make such areas less susceptible to fire and floods. Otherwise, lives, property and other valuable resources will continue to be lost.

ESTABLISHMENT OF RECREATIONAL USE OF NATIONAL FORESTS AS A POLICY OF CONGRESS is again proposed in a number of bills, some of which call for earmarking of receipts for recreational developments. The measure most likely to receive consideration, however, is one sponsored jointly by Senators Neuberger and Morse of Oregon, Murray of Montana, Humphrey of Minnesota, and Clark of Pennsylvania. This would direct the Secretary of Agriculture to make a comprehensive study of national forest recreational needs and to report within one year a 10-year plan for recreational developments. Purpose is to establish a "Mission 66" type program for national forests similar to that now in progress on the national parks. Representative McIntire of Maine has introduced a bill to authorize the Secretary of Agriculture to cooperate with public and private agencies in the development of recreational facilities on national forests; and Representative Saylor of Pennsylvania seeks Congressional policy on public use of domain forest lands and woodlands.

WHOLESALE WITHDRAWALS AND RESERVATIONS OF PUBLIC LANDS FOR DEFENSE PURPOSES which attracted the attention of the 84th Congress may be halted by the 85th. Last year when Representative Engle of California, chairman of the House Committee on Interior and Insular Affairs, saw that his bill to establish Congressional control could not be enacted before the end of the session, he requested the defense agencies to limit their acquisitions. The Engle bill has been reintroduced; it is expected that his committee will take early action on it. The bill would require Congressional approval of any withdrawal or reservation in excess of 5,000 acres.

Forest Forum

(From page 76)

tection of the New Hampshire Forests, promptly served notice that if this intention were to be carried out, he would throw all his influence towards transferring these forests to the Department of the Interior as national parks, a plan which at that time, Interior was looking upon with considerable interest—see Shenandoah and Great Smokies National Parks! Whatever the cause, the Forest Service did not follow up its plan; and the "homesites" in the White and Green Mountain National Forests, bought with public funds for public purposes, have not, by a mistaken policy, been ceded back to individuals in perpetuity under "annually renewable leases."

In the western states, with from 30 to 95 per cent of the area of respective states still belonging to the federal government, it is one thing to adopt a liberal policy towards summer home seekers. In the crowded East, where every acre of national forests, with a few exceptions in Minnesota, Arkansas and Florida, had to be bought back and paid for, it is a horse of a different color. National forests are for the greatest benefit to the greatest number of people in the long run, not for a privileged few to settle on to the exclusion of the public, as happened at Cass Lake.

Herman H. Chapman
Professor Emeritus
School of Forestry
Yale University
New Haven, Connecticut

Frank Article Praised

EDITOR:

I want to commend you for the excellent article on Watersheds by Bernard Frank in your October issue. Needless to say, although it is aimed primarily at Maryland, it applies with validity to many other eastern states. The precise statements of both the problems and the current attempts at solution make the presentation extremely clear.

I wonder if there is any possibility of obtaining reprints of this article for distribution to our local association.

John T. Carson Jr.
Neshaminy Valley Watershed Assn.
Project Director
Newtown, Pennsylvania

10 Danger Spots

EDITOR:

I want to congratulate you for publishing in the July issue the article, "10 Danger Spots in Conservation," by the 1956 Conservation Committee of the National Council of State Garden Clubs.

Every section of this report is of vital importance to the life of this country, in fact, to the continuation of this country as a nation.

For some years I have been disturbed at the amount of chemical fertilizers and poison sprays being used in the production of our food and also at the devitalizing effects of processing our food. Our present "way of life" cannot produce a strong race; and unless something is done, we are on the way out.

Our treatment of the Indians is an everlasting disgrace. Granted his civilization was not as highly developed as that of the early settlers, but he was fighting for his own country against foreign invaders. Would we not have done the same and

with every means at our disposal?

I would appreciate getting the address of the National Council of State Garden Clubs.

Robert E. Baylor
Route 3,
Blackstone, Virginia

Letter from Pennsylvania

EDITOR:

We realize that the pages of AMERICAN FORESTS magazine are not the proper place to settle a case of law. However, in the November issue you published a letter by Maurice K. Goddard, Secretary of Forests and Waters of The Commonwealth of Pennsylvania, in which he made statements of charges which we know to be untrue and are certainly unsubstantiated. This reacts to the injury of Musser Forests, Inc. and deliberately puts this firm in a questionable position before the readers of AMERICAN FORESTS. We certainly cannot justly be denied an answer.

By implication and by outright statement Mr. Goddard has taken it upon himself to make a finding of guilty prior to any decision of a court of law. This sort of thing is, I believe, resented by any true American for in this country we are considered innocent until proved guilty.

In regard to the charge of selling state seedlings, Mr. Goddard makes this statement, and I quote, "These were sold in violation of the law and of the written agreement for in excess of \$157,000.00."

Musser Forests denies this charge and we wish to call attention to the fact that this case came up before the court on November 13, 1956 and Judge Sohn fully sustained Musser Forests' contention that the state had failed to allege facts supporting its supposed cause of action against Musser Forests or any of the other defendants and gave the state 20 days within which to file a "proper and sufficient complaint."

In April, 1956, the Pennsylvania Department of Agriculture revoked Musser Forests' nursery certificate for allegedly selling infected trees. In this case the court ordered the revocation stayed. It is true that this was conditioned on Musser's compliance with the Plant Pest Act, which is like saying to you that you must agree to quit beating your wife. No infected trees have ever been shipped with the knowledge of the management of Musser Forests, and we wish to add that Musser Forests has received a new certificate for the year beginning October 1, 1956.

Musser, like most nurseries, has a quarantine bed. It is possible for someone to take trees from this bed prior to proper treatment without the knowledge of the management, but all trees shipped by Musser Forests must pass thorough inspection. In fact, the state inspector has commented that Musser nurseries are among the cleanest he has seen.

Space would not allow nor do we wish to go into the political implications and the long history back of this attack. Musser Forests has grown and thrived through a policy of honest dealing with the public and in producing the best possible product. Anyone visiting our nurseries and examining our record of satisfied customers can verify this fact.

Fred A. Musser
Musser Forests, Inc.

**QUALITY
SPECIFICATION SIZE
PULPWOOD CHIPS FROM**
• SLABS • EDGINGS
• ROUND WOOD OR
• VENEER CORES

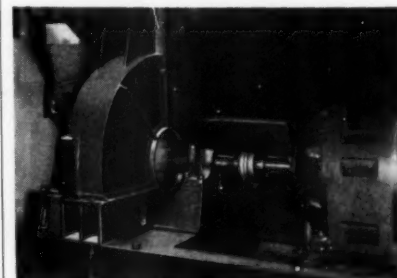


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Mills throughout the country have stopped burning dollars and are now selling chips. Their preference for MURCO Wastewood Chippers is the MURCO outstanding performance, producing more and better chips at less cost, with less sawdust and slivers, free from repairs while at the same time having production records of 100 cords or over per hour.
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Feature Photo of the Month

Photos used on this page will be of unusual rather than esthetic qualities and subject matter will be restricted to scenes, events, objects or persons related to the use, enjoyment or unique aspects of our renewable natural resources. For each picture selected AMERICAN FORESTS will pay \$10

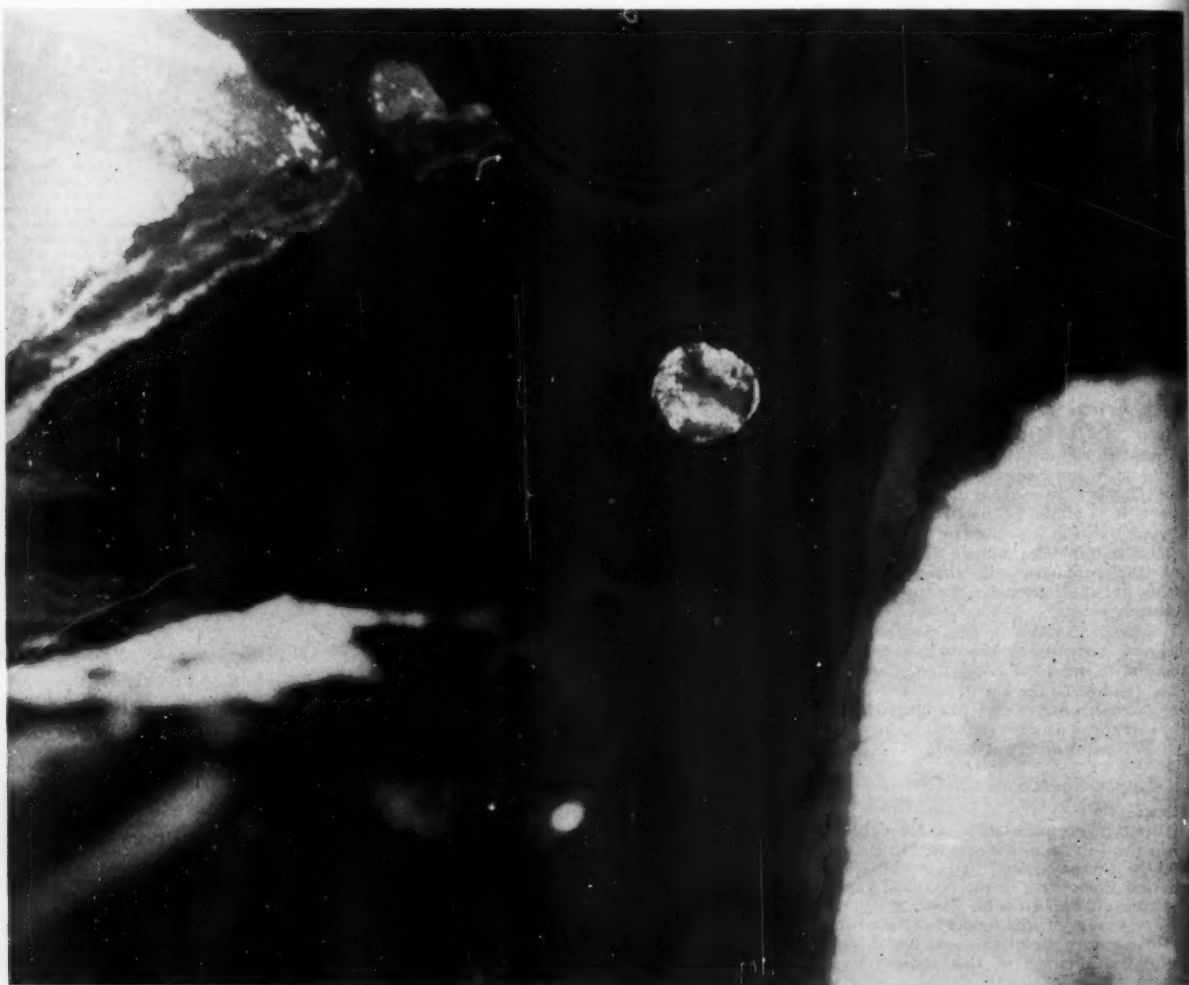


Photo submitted by Harold L. Monroe, Lomita, California

With several other people, Mr. Monroe stood inside the Chimney Tree in California's Big Basin State Park. This huge Redwood tree had much of the inner portion burned away back in 1851, yet the tree is still alive and green branches reach for the sky as they have been doing for years. The hole in the top is some 75 feet above ground

Brings Down Trees Up To 6 Feet in Diameter



This Lightweight Chain Saw Packs Real Power

The Homelite 5-20 — with 5 full horsepower and easy-to-handle 20 pounds — fells, bucks, notches and limbs with less effort and in less time. It brings down trees up to 6 feet in diameter — cuts through 20 inch trees in 20 seconds. And because of its diaphragm carburetor and positive fuel pump, the 5-20 lets you cut from all angles, in any position — with no adjustment or loss of power.

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costs in any cutting operation. And in addition to its wide range of straight blades and plunge-cut bows for all types of production cutting, the 5-20 can be converted to a brush cutter for clearing fire lanes in pulpwood or timber tracts. A special clearing attachment is also available for speedier, easier limbing or for clearing out small trees.

Your Homelite dealer will be glad to give you a free demonstration of this power-packed, value-packed 5-20. See him soon.

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A COMPLETE LINE OF CHAIN SAWS FOR EVERY CUTTING JOB



Model 12 . . . lightest, most powerful direct drive chain saw ever developed. Only 19 pounds, full 5 horsepower. Brings down trees up to 3 feet in diameter.



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5-20



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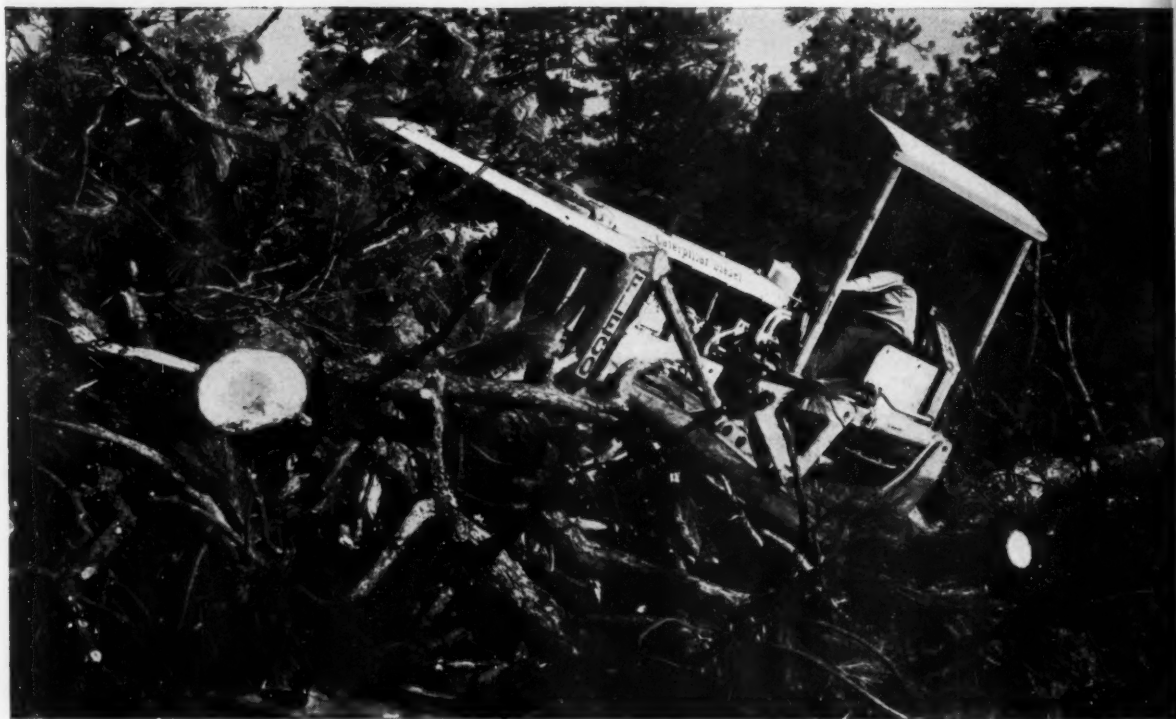
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This D4 piles slash from a daily cut of 50,000 bd. ft.



The White Swan Lumber Co., White Swan, Washington, uses this CAT* D4 Tractor with Fleco Root Rake in its selective logging operation on the Yakima Indian Reservation. The D4 piles slash from a daily cut of 50,000 bd. ft. It works an 8-hour day, 5 days a week. The company bought it for several reasons. Among them: the excellent reputation of the nearby Caterpillar Dealer for service and the excellent reputation of Caterpillar-built equipment for dependable performance under difficult conditions. Robert Turner, White Swan's superintendent, says: "We're very well satisfied with our D4."

Any machine can do the easy jobs. But it takes a tough machine to stand up day after day under the punishment of hard work. That's the kind of work heavy-duty Cat-built machines take in stride. For example, the D4 is compact and maneuverable, but rugged enough to handle any man-sized assignment in rough going—fighting fires, opening fire lanes or building roads. From its specially hardened track shoes and pins to its sturdy 63 HP (flywheel) Caterpillar Diesel Engine, it is built to outwork and outlast

any machine in its power range. What's more, since it burns low-cost, non-premium fuel without fouling, it's economical to operate. And maintenance takes a minimum amount of time. The exclusive Caterpillar fuel system requires no adjusting.

Your Caterpillar Dealer backs every Caterpillar unit, no matter how old, with parts you can trust. He provides prompt service 24 hours a day. For complete facts about the D4, call on him. Better still, ask to see it working—he'll be glad to demonstrate!

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